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(54) **Device for feeding/singularizing of blanks, labels, or similar**

Vorrichtung zum aufeinanderfolgenden Zuführen von Zuschnitten, Etiketten oder dergleichen

Dispositif pour alimenter une à une des feuilles, étiquettes ou similaires

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## Description

**[0001]** The invention relates to a device for feeding-singularizing of blanks, labels, or similar, in particular in a cigarette packing machine, according to the preamble of claim 1.

**[0002]** At present devices of this type are known as disclosed in DE-A-44 39 723, DE-A-4029520, EP-A-0 331 325, or WO 98/42604.

**[0003]** All this known devices typically comprise at least a pick up and transfer module which is interposed between the discharge opening of a feed hopper and conveyor means. The pick up and transfer means have transfer heads which pick the last blank of a stack of blanks housed in the feed hopper and transfer each blank to the conveyor which transports the single blanks to the further operating units for example of a packing or wrapping machine. The pick up and transfer modules are synchronized with the conveyor.

**[0004]** As the output of the packing machines, in particular in the field of the tobacco industry, is constantly being increased, the rate of activation of the pick up and transfer modules reaches considerable speeds during transfer of the blanks from the discharge opening of the feed hopper and the conveyor.

**[0005]** Furthermore, at the moment of delivery of the blank on the conveyor, in order to guarantee an extremely precise position without straining the construction of the pick up and transfer modules and of the parts activating the same it would appear advantageous to confer to the blank a motion of acceleration in direction of the conveyor that inserts it in the manufacturing cycle of the machine. This would permit to avoid too long stops of the conveyor and therefore again excessive accelerations and decelerations that weigh upon the construction and the dimensioning of the drive motor and the drive chains.

**[0006]** The invention has therefore the aim to make a device of the type described at the beginning, that thanks to a relative simple construction can ensure the maximum operational reliability and allows to reach high working speeds without excessively weighing down the dimensioning of the drive kinematics and the drive motor.

**[0007]** The invention attains the above aims with a device according to the preamble of claim 1 and further showing the features of the characterising part of claim 1.

**[0008]** According to a further feature at least one pick up/transfer module is provided in combination with means which vary at least the component of motion of the same in direction of advancement of the conveyor in such a manner that upon depositing the blank on said conveyor, the pick up module and the blank it carries have the same speed in the direction of advancement of the conveyor itself.

**[0009]** Advantageously the variator means of the speed of the motion at least in one component of the

motion are made in such a manner to eventually vary also the speed of one or both the motion components of the circular motion in order to ensure a stable relative positioning of the pick up/transfer means and of the feeder at least during the pick up phase of the blank from the said feeder.

**[0010]** In particular, the pick up/transfer assembly is formed by a support module that is guided on the circular track by conveying means with a constant speed of rotation, while the pick up/transfer head is mounted movable at least in direction of one of the two components of the circular motion, preferably according to both the components of the circular motion relative to the support module by variator means of the speed of advancement of the said head with regards to the associated support module.

**[0011]** One particularly advantageous configuration provides for the direction of pick up of the blanks from the feeder to be perpendicular or in any case transversal to the direction of advancement of the conveyor.

**[0012]** One form of execution of this configuration in particular, provides for a hopper for feeding the blanks vertically oriented and with a discharge opening at the bottom end, the said discharge opening overlaps at a certain distance the input or loading end of a band conveyor the direction of conveyance of which is horizontal, while the circular track of at least one pick up/transfer module has a vertical and a horizontal motion component and the axis of rotation is provided on the side of the track of conveyance of the conveyor opposite to the feed hopper.

**[0013]** Advantageously the pick up/transfer means have additional pick up/transfer modules that are distributed angularly equidistant along the circular track.

**[0014]** According to a further advantageous feature, the means that vary the speed components of the pick up/transfer heads of the individual pick up modules are connected to the modules themselves and move together with the same on the circular track.

**[0015]** A preferred form of execution, provides for the pick up/transfer module each of which is formed by a support module and of at least one pick up/transfer head that is articulated on the support module by means of a set of levers, in order to form an articulated quadrilateral and the said levers are articulated to small shafts distanced from each other and which are freely supported turning in the support module and are provided along the sides of said support module transversally to the direction of advancement, on the front and the rear with regards to the direction of advancement, at least one of these articulated levers constitutes the drive lever of the articulated quadrilateral and is mounted turning together with its shaft that dynamically engages rotary wise with the rotary drive of the same that turn coaxially to the circular track of the pick up/transfer modules and that can be activated turning with a speed and/or direction of rotation different from the one of the pick up/transfer modules along their circular track.

**[0016]** In this manner, the differential rotation of the means driving the rotation of the shafts associated with the drive lever of the articulated quadrilaterals allows to give to the pick up/transfer head differential drive components both radially and tangentially with regards to the components of the motion along the circular track of advancement of the support modules. A suitable staggering of the speed of rotation of the activating means of the driven levers allows to substantially cancel the component of horizontal motion in the position of pick up of the blank from the bottom of the hopper. In this case, the tangential component substantially horizontal and in the direction of advancement is being cancelled by the backward motion of the pick up/transfer head due to the activation of the articulated quadrilateral, therefore the said head carries out substantially a movement parallel to the axis of the hopper or to the direction of discharge of the blank from the same. With regards to the position of delivery of the blank on the band conveyor two different options are possible. In a first option the speed of the pick up/transfer modules along the circular track is regulated in such a manner, that the component of motion of the pick up/transfer heads in direction of advancement of the band is identical to the speed of advancement of the band without the requirement of an additional increase of the drive speed of said heads relative to the motion on the circular track of the support modules. An additional relative motion of the pick up/transfer head may be required in a variation. In this case the differential rotation of the means driving the articulated parallelograms involve apart from the vertical motion of nearing the blank to the band conveyor a positive or negative acceleration in the horizontal direction of advancement relative to the standard horizontal component of the circular motion of advancement of the pick up/transfer modules. The two components of motion add up between themselves making the speed of the pick up/transfer head identical to the one of the bands at the moment of transfer of the blank onto the band conveyor.

**[0017]** According to a further feature of the executive form, the pick up/transfer modules in form of an articulated parallelogram are supported by driving means along the circular track such, that the support module moves along the circular track keeping always one single orientation, in particular a horizontal orientation with reference to the plane containing the axis of the two shafts.

**[0018]** In this case providing two levers identical to each other also the pick up/transfer heads have always the same orientation, in particular an orientation parallel to the one of the support module as far as the axes of articulation of the pick up/transfer heads to the corresponding extremities of the two levers of articulation are concerned.

**[0019]** Such arrangement is advantageously obtained by driving means of the pick up/transfer modules formed by two discs with axes parallel to the shafts of articulation and drive associated with the support mod-

ules, one of the two shafts being supported turning freely only in one disc, while the other shaft is supported turning freely only in the other disc and as the two discs are parallel to each other, but with axes staggered to each other in a dimension corresponding to the distance between the shafts connected to the support module of the pick up/transfer modules at least one of these discs is rotary driven, while the other is idle.

**[0020]** When the orientation of the plane containing the two shafts must be horizontal, then the staggering of the axes of the two drive discs is provided only in the horizontal direction.

**[0021]** According to a further feature, the supporting module has a length in the axial direction of the discs that is substantially corresponding to the dimensions of the blank in said direction, while each support module carries two, three or more pick up/transfer heads identical to each other and placed side by side at a certain distance from each other, the said pick up/transfer heads are each articulated with their own articulating levers to the same shafts of articulation and drive connected to the the support module and that have a corresponding axial extension.

**[0022]** The band conveyors has advantageously a pair of bands designed to engage with the end areas of the blanks, forming a free zone for the passage of one or more of the pick up /transfer heads, while the two bands have top teeth or ribs that form front and rear stops with the corresponding edges of the blank.

**[0023]** In combinations with the two toothed conveyor bands, the band conveyor can have in position of non-interference with the free passage of the pick up/transfer heads one or a pair or more additional retaining bands parallel to each other and to the toothed conveyor bands which are additionally under suction, in order to hold the blanks effectively in the position of engagement between the front and rear stop teeth of the bands during advancement on the same.

**[0024]** Each pick up/transfer head is under suction, the connecting conduits to the source of vacuum passing through the free shaft associated with the support module and that extends itself into a circular distributor, while subsequently it is made to pass through the support module in the drive shaft and through the same into the drive levers rotary integral with this latter, while the conduits made in the drive levers open into a plenum chamber in the corresponding pick up/transfer head from which the vacuum is distributed to the suction nozzle or nozzles or to the suction cup or caps.

**[0025]** In particular each pick up/transfer head has a body to which the levers are articulated and that carries at least one or more suction cups or suction nozzles.

**[0026]** To further the separation of the last blank from the stack in the hopper and that is in correspondence to the exit of the same, a narrowing of the hopper is provided in such a manner that the last blank takes up an arched position, separating itself in the middle from the once above.

**[0027]** Said narrowings are preferably provided on the sides of the hopper mouth which are transversally to the direction of advancement of the band conveyor.

**[0028]** Furthermore in combination with this feature or separately, the suction pad or pads can have means of motion that determine a sliding in the axial direction of the hopper with a very rapid stroke and that takes place relative to the body of the pick up/transfer head.

**[0029]** Advantageously, the end conduit of connection to the source of vacuum is made in shape of a cylindrical chamber and houses within in a sealed sliding manner and against the action of a spring part pushing the supporting rod of the suction cup outwards which is itself also cylindrical.

**[0030]** Therefore, when the suction cup comes into contact with the blank, the suction is no longer free through it and can act against the action of the spring part in the sense of recalling the rod of the suction cup to its innermost position. The suction cup is therefore made to sharply move away for a certain dimension limited by the exit of the hopper, as the stroke is commensurate in a manner sufficient to free the blank from the tightening at the exit of the hopper itself.

**[0031]** The advantages of the present invention are clearly evidenced by the above description and clearly consist in the fact that it allows for high feeding rates of the blanks without requiring excessive torque loads for the fast acceleration and deceleration of the pick up/transfer means of the blanks. In fact, while the transfer/pick up modules move in their whole with a rotary motion substantially uniform and constant, the periods of rest or acceleration are obtained imposing differential motions only on the pick up/transfer heads and therefore to modules with lower inertial mass and above all limiting the differences in speed at which they must be accelerated and decelerated every time the operative heads, thanks to the fact that one operates during the addition up or detracting of the differential components of motion.

**[0032]** The device according to the invention allows furthermore to work with a plurality of pick up/transfer modules that succeed each other in a continuous manner and which allow to reduce the speed of movement of said modules on the circular path. This allows for the reduction of the speed of advancement of the pick up/transfer modules on the circular track to such levels as to minimize the differences in speed to be applied to the pick up/transfer heads to obtain the desired behaviour of motion and to avoid excessive driving speeds of the pick up modules.

**[0033]** The invention has further perfectionings that are subject of the claims below.

**[0034]** The features of the invention and the advantages derived therefrom are better evidenced in the following description of a nonlimiting executive example illustrated in the attached drawings, in where:

**[0035]** The Fig. 1 shows a plan view from above partially in cross section of the device according to the invention.

**[0036]** The Figs 2 and 3 illustrate two enlarged areas of Fig. 1.

**[0037]** The Figs 4 to 9 illustrate schematically the pick up and transfer cycles of the blank with the device according to the preceding Figs.

**[0038]** The Figs 10 and 11, show two enlarged details similar to the Figs 4 to 9 with the pick up/transfer modules in two cycles of pick up of the blank at the discharge end of the hopper.

**[0039]** The Figs 12 to 17 illustrate different views in cross section of a pick up/transfer module.

**[0040]** The Fig. 15 is a perspective view of the device according to the preceding figures.

**[0041]** A device feeding singularizing of blanks, labels or similar, comprising a hopper 1 substantially vertical and for a stack of blanks. The hopper 1 has a bottom end for discharging the blanks F and is oriented with at least one axis of the blanks transversal to the direction of advancement F of a band conveyor 2. In correspondence to two opposite side and transversal or substantially transversal to the direction of advancement A of the conveyor 2, the hopper 1 has a tightening wall 101. 201. The two walls are inclined and converging. As evidenced in the Figs 10 and 11, this causes a blank F or some to form an arch in a convex manner in direction of discharge separating in the middle area from the blanks above. By appropriately adjusting the length of the converging sections and/or their inclination one can also obtain the effect of a progressive arching of the blanks bit by bit as their position in the stack approaches the discharge opening of the hopper 1.

**[0042]** The band conveyor 2 is arranged directly below the discharge opening of the hopper 1 and with the conveying branch which apart from the arching for destacking is parallel to the face of the blanks F. The band conveyor 2 is constituted by a first pair of bands 102 which are parallel to each other and are provided in the area of the lateral ends of the hopper 1 in order to cooperate only with the opposite end sections of the blanks. The two bands 102 are wound around standard drive pulleys and are moved together in a synchronized manner. The two bands 102 have at distances corresponding substantially to the dimensions of the area of the blank intended to rest on the same sets of teeth 202 as front and rear stops for the blanks F respectively, with reference to the direction of advancement A of the band conveyor 2. In this way, the band conveyor 2 has seatings for housing the blanks F that ensure the correct preset positioning relative to each other of the individual blanks F of the sequence on the band conveyor 2 itself. An additional pair of bands 302 themselves also wound around the same rollers of the toothed bands 102 are provided in the middle section. The second pair of bands is under suction and has the function of holding the blanks adhering to the conveyor exerting a force perpendicular to the plane of conveyance. All the conveyor bands 102, 302 are parallel and move together and are laterally distance from each other in such a way to leave,

in this case, three free intermediate passageways which allow for the passage like a comb of the pick up/transfer heads 5 of the the pick up/transfer modules 6 that have the function to pick up in sequence a blank in correspondence of the discharge opening of the hopper 1 and deposit it in the seating between the teeth 202 of the bands 102 of the conveyor band 2.

**[0043]** A plurality of pick up/transfer modules is provided directly under the band conveyor 2 and the discharge opening of the hopper 1.

**[0044]** In particular the said pick up/transfer modules 6 are guided along a circular track the axis of which is perpendicular to the direction of advancement A and parallel to the axis of the hopper transversal to said direction of advancement, in such a way as to carry the pick up/transfer heads 5 along a circular track that is tangential or substantially tangential to the face of the blank F at the discharge end of the hopper 1 itself.

**[0045]** Each pick up/transfer module 6 has a support module 106 which houses the shafts 7, 8 parallel to each other and to the axis of the circular track of the pick up/transfer modules 6. The support module or support has in a position centred with the passageways between the bands 102, 302 of the band conveyor 2 openings 206 through which the levers 9, 19 of articulation of a corresponding pick up/transfer head 6 that is hinged at the free end of the levers 9, 10 are connected to the shafts 7, 8. The two levers 9, 10 have axes of articulation at equal distance from each other and so does also the support module 106 and the pick up head 5, in such a manner that each pick up/transfer head 5 forms a branch of an articulated quadrilateral. To each support module 106 of each pick up/transfer module 6 are therefore connected three pick up/transfer heads 5 each being part of an articulated quadrilateral and each of which has a suction pad 11 oriented towards the face of the blank F on the discharge opening of the hopper 1.

**[0046]** One shaft 7 is supported in a manner to rotate freely around its axis only in correspondence of one of its ends, thanks to an extension beyond the corresponding axial end side of the support module 106 of each pick up/transfer module 6. The shaft 7 protrudes beyond the opposite face of the disc 12 and has a gear 13 that engages with a gear wheel 14 coaxial with the disc 12. The other shaft 8 provided at a certain distance from the first is supported only in correspondence of its end opposite to the one of support of the first driven shaft 7 in a freely rotating manner in a second disc 15 that is parallel to the first and is connected to the other axial end side of the support module 106. Also the shaft 8 extends itself beyond the corresponding end side of the support module 106 and beyond the opposite face of the associated disc 15. The two discs 12 and 15 are parallel to each other and their axes are staggered in a direction parallel to the one of advancement A, that is in a horizontal direction in a measure corresponding to the distance between the shafts 7 and 8 that form the articulated parallelogram supporting the pick up/transfer

heads 5.

**[0047]** While the shaft 7 driven by the central gear 14 must extend itself over the entire length of the support module 106 or at least in correspondence to all the pick up/transfer heads 5, it is not necessary that the shaft 8 be made as a piece. In particular at the corresponding end associated with the support module 106 a hub 8 can be connected that protrudes from the end itself, while in the area of each opening 206 of the support module 106 it is possible to provide fulcrum pins coaxial to each other and to the hub 8.

**[0048]** The extension of the support or the hub 8 have a coaxial central whole that opens on the side of the end protruding beyond the disc 15 and connects thanks to a sliding seal with slots that have a circular cross section 116 of an annular distribution flange that connects to a vacuum source.

**[0049]** The conduit 108 in the hub 8 connects with a coaxial chamber 107 in the driven shaft 7 thanks to a conduit of distribution in the support module 106 that opens into a chamber in correspondence of the end side of the driven shaft 7 inside the support module, the seal being ensured also in this case thanks to a sliding seal.

**[0050]** The arms 9 are clamped 109 in manner to rotate with the same in the shaft 7 and have axial conduits that open in correspondence of radial exit wholes 207 of the shaft 7. The opposite end of the driven arms 9 is clamped on revolving pins 105 supported at the corresponding end of the body 205 of the associated pick up/transfer head 5 the revolving pins 105 have an axial conduit 305 that opens into a distribution chamber 405 in the body 205 of the pick up/transfer head 5 from which departs a conduit 505 that opens into a cylindrical chamber 605 whose axis is perpendicular to the stack of blanks, or substantially parallel to the axis of the hopper 1. In the chamber 605 is housed in a sealed and axially sliding manner the hollow rod 117 of the suction cups 17. A spring part, for instance a coil spring 18 is placed between the bottom of the chamber 605 and an annular shoulder 217 of the rod 117 of the suction cup 17. Preferably the coil spring 18 is of a diameter smaller than the internal diameter of the hollow rod 117 of the suction cup 117 inserts itself inside the same abutting against an internal shoulder 217 preferably at the end section connecting to the suction cup itself.

**[0051]** The lever 10 is articulated on the shaft or on the pins 8 in a freely turning manner and with the other end in a manner freely turning around pins of articulation 805 provided on the extremity of the body 205 of the pick up/transfer head 5 opposite to the one of articulation of the driven lever 9.

**[0052]** With particular reference to the Fig.s 1 to 3, the drive motion of the pick up/transfer module 6 drive along the circular track and the drive motion of the shafts 7 is take from the same power takeoff 20. The main shaft 21 drives thanks to the gears 22 and 23 the input shaft 124 of an intermediate drive link 24 the output shaft 224 of which extends itself as a drive shaft of the gear 14 driv-

ing the shafts 7. The disc 12 is rotary integral with a hollow shaft 25 inserted in a manner rotating relative to the same, coaxially on the shaft 224 and that is driven by the main shaft 21 thanks to the gears 26, 27, 28. The Fig.s 1 and 2 show a plan lay out of the kinematic chains. In particular as the kinematic drive chain of the disc 12 is provided with the gear 27 in a position under the input shaft 124 of the intermediate drive link 24, the kinematic chain connected to the disc 12 would appear to be interrupted. The plan layout evidences the fact that part of the gear 27 is repeated in the position of engagement with the gear 28 integral with the hollow shaft 25.

**[0053]** The Fig.s 1 to 3 evidence further the fact that only the disc 12 is driven rotary wise, while the disc 15 idles and is pulled by the support modules 106 of the pick up/transfer modules 6.

**[0054]** A further feature consists in the fact that the disc 12 is made in shape of a box closed to the outside and inside which the gears of the driven shafts 7 and the central gear 14 are housed.

The operation of the device according to the invention becomes evident from the Fig.s 4 to 9.

**[0055]** Each pick up/transfer module 6 is carried in sequence to the pickup position of the blank F respectively in correspondence of the discharge opening of the hopper 1, as said modules 6 are being moved with a uniform motion along the circular track and in direction of the arrow of advancement P. Thanks to the intermediate drive link 24 the gear 14 that is coaxial to the rotary driven disc 12 can assume speeds and/or directions of rotation different from those of the disc 12. Such variations in speed and direction of rotation are selected in such a manner, that each pick up/transfer module 6 reaches the position of pick up of the blank with the suction pads in contact with face of the central section of the blank, with the pick up/transfer heads that precede the associated support module 106 (Fig. 4). The differential rotation of the gear 14 allows the component of advancement of the pick up/transfer heads 5 in the tangential direction to be cancelled that is in the direction parallel to the face of the blank, that is in direction of advancement of the band conveyor 2. The pick up/transfer heads 5 consequently carry out relative to the blank in the hopper 1 only one motion substantially perpendicular to this, or in direction of the axis of the hopper.

**[0056]** During this phase, as is shown in the Fig.s 16 and 17, as the blank comes into contact with the suction cup 17, this one carries out the motion of release back towards the body 205 of the pick up/transfer head 5, easing the separation of the blank from the discharge opening of the hopper 1 together with the motion of the pick up head 5 given by the differential rotation of the gear 14. Upon separation of the blank from the mouth of the hopper 1, the pick up/transfer heads have not yet reached their maximum position of retraction with regards to the support module 106 (Fig. 6). The subsequent motion of advance of the support module 106 along the circular track, while the gear 14 takes up a

speed of rotation substantially corresponding to the one of the disc 12, after having reached the maximum position of retraction of the pick up/transfer heads 5, allows the descent of the pick up/transfer heads 5 towards the band conveyor with a direction and a speed such as to converge towards the same (Fig. 8), with the blank substantially aligned with the set of teeth 202 as the component of the motion is parallel to the band conveyor itself at the moment (Fig. 9) the blank F is deposited on the conveyor. Before the subsequent picker/transfer module 6 reaches the pick up position, the gear 14 is rotated in such a manner as to return the pick up/transfer heads 5 again into the advanced position relative to the support modules 106, resetting to the conditions shown in Fig. 4.

**[0057]** Obviously what described is only one of the forms of operation of the device according to the invention that within the limits permitted by the structure can have also other forms of operation. In this form, in fact, the pick up/transfer modules 6 move on the circular track with a speed such, that in the position of depositing the label on the conveyor band the component of motion of the same parallel to the direction of advancement of the conveyor 2 is equal to the speed of advancement of the same. Therefore in this condition the modules 6 and in particular the heads 5 do not carry out any differential motion relative to the motion of the disc 12.

**[0058]** This obviously simplifies the operation. Nevertheless with the device according to the invention it is possible to provide a phase of agreement of the speed analogous to the one at the point of pick up of the blank also at the phase of deposit.

**[0059]** Naturally, the invention is not limited to the executive forms described above and illustrated but can be amply varied above all constructively without for this abandoning the scope of the appended claims.

## Claims

1. Feeding-singularizing device of blanks, labels, or similar, in particular in a cigarette packing machine, comprising:
  - a feeder (1) of blanks (F) with a discharge end;
  - a conveyor (2) of the blanks with an input end connected to the discharge end of the feeder (1);
  - pick up/transfer means (5, 6, 17) of a blank (F) that pick up one blank at the time at the discharge end of the feeder (1) and convey it depositing it on the input end of the conveyor (2), the pickup/transfer means (5, 6, 17) having at least one pick up/transfer module (6) that is guided on a circular track having an axis transverse to the direction of advancement (A) of the conveyor (2), between the position of pick up of the blank (F) at the discharge end of the feed-

er (1) of the blanks (F) and the position of depositing the blank on the conveyor (2); the pick up/transfer module (6) having pick up/transfer heads (5);

- driving means (14) for moving the pick up/transfer heads (5) between discharge end of the feeder (1) and conveyor (2)

**characterised in that**

- the pick up/transfer means (5,6,17) are arranged under the conveyor (2) on the side opposite to the feeder (1);
- the conveyor (2) has longitudinal passageways for the pick up/transfer heads (5) cooperating with the blank.

2. Device according to the claim 1, **characterized by** the fact that said driving means comprise means (7, 8, 9, 10, 12, 13, 14, 24) that vary at least the component of motion of the pickup/transfer heads (5) in direction of advancement (A) of the conveyor (2) in such a manner that at the moment of depositing the blank (F) on the said conveyor (2), the pick up/transfer heads (5) and the blank (F) carried by the same have the same speed in direction of advancement of the conveyor (2) itself.

3. Device according to the claim 2, **characterized by** the fact that the variator means (7, 8, 9, 10, 12, 13, 14, 24) of the speed according to at least one component of motion are made in such a way as to eventually vary also the speed of one or both the components of the circular motion in order to ensure a constant relative positioning of the pick up/transfer heads (5) and of the feeder (1) at least during the pick up cycle of the blank (F) from the said feeder (1).

4. Device according to one or more of the preceding claims, **characterized by** the fact that the pick up/transfer module (6) is formed by a support module (106) that is guided along the circular track (P) by conveyor means (12, 15) eventually with a constant speed of rotation, while a pick up/transfer head (5) is provided that is fitted movable at least according to one of the two components of the circular motion, preferably according to both components of the circular motion relative to the support module (106) by variator means (7, 8, 9, 10, 12, 13, 14, 24) of the speed of advancement of the said head with regards to the associated support module (106).

5. Device according to one or more of the preceding claims, **characterized by** the fact that the direction of pick up of the blanks (F) from the feeder (1) is perpendicular or in any case transversal to the direction of advancement (A) of the conveyor (2).

6. Device according to one or more of the preceding claims, **characterized by** the fact that the pick up/transfer means have a plurality of pick up/transfer modules (6) which are distributed angularly equidistant along the circular track (P).

7. Device according to one or more of the preceding claims 2-6, **characterized by** the fact that the means (7, 8, 9, 10, 13) that vary (7, 8, 9, 10, 13) the components of motion of the pick up/transfer head or heads (5) of the individual pick up modules (6) are connected to the modules (6) themselves and move together with the same on the circular track (P).

8. Device according to one or more of the preceding claims, **characterized by** the fact that each of the pick up/transfer modules (6) is constituted by a support module (106) and at least one pick up/transfer head (5), preferably more pick up heads side by side to each other and the said head or heads (5) are articulated on the support module (106) by means of a pair of levers (9, 10), in order to form an articulated quadrilateral and the said arms a fulcrated on shafts (7, 8) distanced between each other and that are supported turning freely in the support module (106) and are provided along the sides of the said support module (106) transversal to the direction of advancement (A), on the front and back respectively with reference to the direction of advancement (A) itself, at least one of those levers (7) constituting the drive lever of the articulated quadrilateral and is fitted revolving together with its own shaft (7) that engages rotary wise dynamically (13) with the rotary drive means (14) of the same that rotate coaxially to the circular track (P) of the pick up/transfer modules (6) and that are rotary driven with speed and/or direction of rotation different from the one of the pick up/transfer modules (6) along the circular track (P).

9. Device according to claim 8, **characterized by** the fact that the differential rotation of the rotary drive means of the shafts (7) connected to the drive levers (9) of the articulated quadrilaterals are such, that the pick up/transfer heads (5) move according to differential components of motion both radially as well as transversally relative to the circular track of advancement (P) of the support modules, in order to substantially cancel the components of rotary motion in the pick up position of the blank from the bottom of the hopper.

10. Device according to the claim 9, **characterized by** the fact that the tangential components substantially horizontal and in the direction of advancement (A) of the band conveyor (A) is cancelled by the move backwards of the pick up/transfer head (5) due to

the activation of the articulated parallelogram, while as a resulting motion the said head (5) carries out substantially a motion parallel to the axis of the hopper or to the direction of unloading the blank from the same.

- 5
11. Device according to one or more of the preceding claims 2-10, **characterized by** the fact that the variator means of the motion are inactive or substantially inactive in the position of deposit of the blank (F) on the band conveyor (2), as the motion of the pick up/transfer modules (6) on the circular track is carried out at a speed such, that the pick up/transfer heads (5) have a speed component of motion in direction of advancement (A) of the conveyor band (2) that is equal to the speed of advancement of the said band conveyor (2).
- 10
12. Device according to one or more of the preceding claims (8-11) **characterized by** the fact that the differential rotation of the drive means (14) of the articulated parallelogram that forms each pick up/transfer module (6) relative to the motion on the circular track of the modules (6) themselves is such, that in addition to the vertical movement bringing the blank (f) closer to the band conveyor (2) an acceleration is imparted to the blank (F) on the pick up/transfer head (5) relative to the standard horizontal component of the circular motion of advancement of the pick up/transfer modules (6) that adds to the latter becoming the speed of the pick up/transfer head identical to the one of the conveyor bands (2) at least at the moment of depositing the blank (F) on the band conveyor (2).
- 15
13. Device according to one or more of the preceding claims, **characterized by** the fact that the pick up/transfer modules (6) in form of an articulated parallelogram are carried on driving means (12, 15) along the circular track such, that the support module (106) moves along the circular track always keeping a single orientation, in particular a horizontal orientation or in any case substantially parallel to the blank on the discharge opening of the hopper (1) and with reference to the plane containing the axis of the two shafts (7, 8).
- 20
14. Device according to claim 13, **characterized by** the fact that also the pick up/transfer heads (5) have always the same orientation, in particular an orientation parallel to the one of the support module (106) with regards to the axes of articulation (105, 805) of the pick up/transfer heads (5) to the corresponding ends of the two arms of articulation (9, 10).
- 25
15. Device according to one or more of the preceding Claims 8-14, **characterized by** the fact that the drive means of the pick up/transfer modules (6) are

formed by two discs (12, 15) with axes parallel to the shafts of articulation and drive (7, 8) connected to the support modules (106), one of the two shafts (7) being supported rotating freely only in one disc (12), while the other shaft (8) is supported rotating freely only in the other disc (15) and discs (12, 15) being parallel to each other, but with axes staggered between each other in a dimension corresponding to the distance between the shafts (7, 8) connected to the support module (106) of the pick up/transfer modules (6) at least one of these discs being rotary driven while the other rotates idle.

- 30
16. Device according to the claim 15, **characterized by** the fact that the plane containing the two shafts (7, 8) of articulation of the support module (106) is horizontal and the staggering of the axes of the two drive discs (12, 15) is provided only in the horizontal direction.
- 35
17. Device according to one or more of the preceding claims 8-16, **characterized by** the fact that the support module (106) has a length in the axial direction of the discs (12, 15) that is substantially corresponding to the dimension of the blank (F) in the said direction, while each support module (106) has two, three or more pick up/transfer heads (5) identical to each other, the said pick up/transfer heads (5) are articulated each with their own levers of articulation (9, 10) on the same shafts of articulation and drive (7, 8) connected to the support module (106) and that have a corresponding axial extension.
- 40
18. Device according to one or more of the preceding claims **characterized by** the fact that the band conveyor (2) has at least one pair of bands (102) intended to engage with the end areas of the blanks (F) and that from a free zone or passageway between themselves for the passage of the pick up/transfer heads (5), while the two bands (102) have teeth or ribs (202) that form front and rear stops with the corresponding edges of the blank (F) and between which each blank (F) is placed.
- 45
19. Device according to claim 18, **characterized by** the fact that in combination with the two toothed conveyor bands (102, 202), the conveyor band (2) has in position of non interference with the free passage of the pick up/transfer heads (5) one or a pair or more additional holding bands (302) parallel to each other and to the toothed conveyor bands (102, 202) and that are under suction.
- 50
20. Device according to one or more of the preceding claims 8-19, **characterized by** the fact that each pick up/transfer head (5) is under vacuum, as the conduits connecting it to the vacuum source are made to pass through the end section of the idle

shaft (8) of the support module and that extends itself into a distributor in form of circular sections (16, 116), while subsequently it is conducted through the support module (106) through the drive levers (9) rotary integral with the latter, while the conduits made in the drive levers open through the pins of articulation (105) into the body (205) of the pick up/transfer heads (5) that connect to the suction nozzle or nozzles or to the suction cup or cups (17).

21. Device according to one or more of the preceding claims 8-20, **characterized by** the fact that each pick up/transfer head (5) has a body (205) on which the levers are articulated and that carries at least one or more suction cups or nozzles (17), each of these nozzles or suction cups is connected to means releasing the motion in direction of separation of the blank (F) from the feeder (1).

22. Device according to one or more of the preceding claims 20 and 21, **characterized by** the fact that the end conduit of connection to the vacuum source in the body of the pick up/transfer heads (5) is made in shape of a cylinder (605) and houses inside in a sealed sliding manner against the action of a spring (18) pushing towards the outside, the support rod (117) of a suction cup (17) that is itself also cylindrical and hollow.

23. Device according to one or more of the preceding claims, **characterized by** the fact that in order to assist the separation of the last blank (F) from the stack in the feeder (1) and that is located at the discharge of the same, it is foreseen for the feeder (1) to have a narrowing (101, 201) such, that the last blank assumes an arched position, separating itself in the center from those above.

#### Patentansprüche

1. Vorrichtung zur Einzelzufuhr von Zuschnitten, Etiketten oder Ähnlichem, insbesondere in einer Verpackungsmaschine für Zigaretten,

- ein, ein Entnahmeende aufweisendes Zufuhrmagazin (1) für Zuschnitte (F);
- eine Fördervorrichtung (2) für die Zuschnitte mit einem, mit dem Entnahmeende des Zufuhrmagazines (1) verbundenen, Aufnahmeende;
- Aufnahme- und Transfervorrichtungen (5, 6, 17) für einen Zuschnitt (F), die einen Zuschnitt (F) zur Zeit aus dem Entnahmeende des Zufuhrmagazines (1) entnehmen und es an das Aufnahmeende der Fördervorrichtung (2) abgeben, wobei die Aufnahme- und Transfervorrichtungen (5, 6, 17) zwischen der Position der Aufnahme des Zuschnittes (F) am Ausgabende

de des Zufuhrmagazines (1) der Zuschnitte (F) und der Position der Abgabe des Zuschnittes an die Fördervorrichtung (2), zumindest ein Aufnahme- und Transfermodul (6) aufweisen, das auf einer Kreisführungsbahn geführt wird, die eine zur Förderrichtung (A) der Fördervorrichtung (2) transversal verlaufende Achse aufweist, wobei das Aufnahme- und Transfermodul (6) einen Aufnahme- und Transferkopf (5) aufweist; und

- Antriebsvorrichtungen (14) zum Bewegen der Aufnahme- und Transferköpfe (5) zwischen dem Ende des Zufuhrmagazines (1) und der Fördervorrichtung (2) einschliessend, **dadurch gekennzeichnet, dass**
- die Aufnahme- und Transfervorrichtungen (5, 6, 17) gegenüber des Zufuhrmagazines (1) seitlich unterhalb der Fördervorrichtung angeordnet sind; und
- die Fördervorrichtung (2) längs verlaufende Betriebspassagen für die mit dem Zuschnitt zusammenwirkenden Aufnahme- und Transferköpfe aufweist.

2. Vorrichtung gemäß Anspruch 1, **gekennzeichnet durch** die Tatsache, dass die genannten Antriebsvorrichtungen Vorrichtungen (7, 8, 9, 10, 12, 13, 14, 24) einschließen, die zumindest die in Richtung der Fördervorrichtung (2) verlaufende Bewegungskomponente der Aufnahme- und Transferköpfe (5) auf die Art und Weise verändern, dass zu dem Zeitpunkt der Abgabe des Zuschnittes (F) auf die genannte Fördervorrichtung (2), die Aufnahme- und Transferköpfe (5) und der von diesen transportierte Zuschnitt (F), bezogen auf die Förderrichtung, die selbe Geschwindigkeit aufweisen, wie die Fördervorrichtung (2) selbst.

3. Vorrichtung gemäß Anspruch 2, **gekennzeichnet durch** die Tatsache, dass die Variatorvorrichtungen (7, 8, 9, 10, 12, 13, 14, 24) für die Geschwindigkeit von zumindest einer Bewegungskomponente, auf die Art und Weise erstellt sind, dass sie des weiteren auch die Geschwindigkeit von einer oder beider Komponenten der Kreisbewegung verändern können, mit dem Ziel, eine gleichmäßige Winkellage bezüglich der Aufnahme- und Transferköpfe (5) und des Zufuhrmagazines (1), zumindest während des Aufnahmezyklus des Zuschnittes (F) aus dem genannten Zufuhrmagazin (1), sicher zu stellen.

4. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche, **gekennzeichnet durch** die Tatsache, dass das Aufnahme- und Transfermodul (6) **durch** ein Trägermodul (106) gebildet wird, das schließlich **durch** Fördermittel (12, 15) mit einer konstanten Rotationsgeschwindigkeit entlang der Kreisführungsbahn (P) geführt wird, während

- ein Aufnahme- und Transferkopf (5) zur Verfügung gestellt wird, der bewegbar, in Bezug auf das Trägermodul (106), gemäß einer der beiden Komponenten der Kreisbewegung, bevorzugterweise gemäß beider Komponenten der Kreisbewegung, mittels Variatorvorrichtungen (7, 8, 9, 10, 12, 13, 14, 24) für die Fördergeschwindigkeit des genannten Kopfes im Bezug auf das zugehörige Trägermodul (106), befestigt ist.
5. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche, **gekennzeichnet durch** die Tatsache, dass die Richtung der Aufnahme des Zuschnittes (F) aus dem Zufuhrmagazin (1) senkrecht, oder auf jeden Fall transversal, zur Förderrichtung (A) der Fördervorrichtung (2) verläuft.
6. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche, **gekennzeichnet durch** die Tatsache, dass die Aufnahme- und Transfervorrichtungen eine Mehrzahl von Aufnahme- und Transfermodulen (6) aufweisen, die winkelbezogen im gleichen Abstand zueinander entlang der Kreisführungsbahn (P) verteilt sind.
7. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche, **gekennzeichnet durch** die Tatsache, dass die Vorrichtungen (7, 8, 9, 10, 13), die die Bewegungskomponenten des Aufnahme- und Transferkopfes oder der -Köpfe (5) der einzelnen Aufnahmemodule (6) verändern, mit diesen Aufnahmemodulen (6) verbunden sind und sich zusammen mit denselben auf der Kreisführungsbahn (P) bewegen.
8. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche, **gekennzeichnet durch** die Tatsache, dass sich jedes der Aufnahme- und Transfermodule (6) aus einem Trägermodul (106) und zumindest einem Aufnahme- und Transferkopf (5), bevorzugterweise mehreren Aufnahmeköpfen nebeneinander, zusammensetzt, und der genannte Kopf, oder die Köpfe, **durch** Vorrichtungen aus einem Paar Hebeln (9, 10), beweglich mit dem Trägermodul (106) verbunden ist, oder sind, mit der Absicht, ein gelenkiges Vierseit zu bilden, wobei die genannten Arme auf voneinander entfernten Wellen (7, 8) drehpunktartig derart gehalten werden, dass sie sich frei im Trägermodul (106) drehen können, wobei sie an den Seiten des genannten Trägermodules (106) entlang, transversal zur Förderrichtung (A), bezogen auf dessen Förderrichtung (A) an dessen Vorder- beziehungsweise Rückseite, zur Verfügung gestellt werden, und zumindest einer dieser Hebel (9) den Antriebshebel des gelenkigen Vierseits darstellt und zusammen mit der eigenen Welle (7), die in rotierender Weise dynamisch (13) in die rotierende Antriebsvorrichtung (14) eingreift,
- drehbar befestigt ist, wobei diese koaxial zur Kreisführungsbahn (P) des Aufnahme- und Transfermodules (6) rotiert und die, mit einer Geschwindigkeit und / oder Richtung, die sich von der der Aufnahme- und Transfermodule (6) entlang der Kreisführungsbahn (P) unterscheidet, rotierend angetrieben wird.
9. Vorrichtung gemäß Anspruch 8, **gekennzeichnet durch** die Tatsache, dass die Differentialrotation der rotierenden Antriebsvorrichtungen der Wellen (7), die mit den Hebeln (9) der gelenkigen Vierseite verbunden sind, derart ist, dass die Aufnahme- und Transferköpfe (5) sich entsprechend der Differentialkomponenten der Bewegung sowohl radial als auch transversal, im Bezug auf die Kreisführungsbahnförderung (P) der Trägermodule, bewegen, mit dem Ziel, die Komponenten der Rotationsbewegung in der Aufnahmeposition des Zuschnittes aus der Unterseite des Zufuhrmagazines im wesentlichen aufzuheben.
10. Vorrichtung gemäß Anspruch 9, **gekennzeichnet durch** die Tatsache, dass die im wesentlichen horizontale und in Förderrichtung (A) des Förderbandes (2) verlaufende Tangentialkomponente **durch** eine Rückwärtsbewegung des Aufnahme- und Transferkopfes (5) infolge der Aktivierung des gelenkigen Vierseits, aufgehoben wird, während der genannte Kopf (5) als eine resultierende Bewegung eine im wesentlichen parallel zur Achse des Zufuhrmagazines, oder zur Richtung der Entnahme des Zuschnittes aus demselben, verlaufende Bewegung ausführt.
11. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche 8 bis 10, **gekennzeichnet durch** die Tatsache, dass die Variatorvorrichtungen für die Bewegung in der Position der Abgabe des Zuschnittes auf das Förderband (2) inaktiv oder im wesentlichen inaktiv sind, wobei die Bewegung der Aufnahme- und Transfermodule (6) auf der Kreisführungsbahn in einer derartigen Geschwindigkeit abläuft, dass die Aufnahme- und Transferköpfe (5) eine Geschwindigkeitskomponente der in Förderrichtung (A) des Förderbandes (2) verlaufenden Bewegung aufweisen, die genauso groß ist wie die Fördergeschwindigkeit des genannten Förderbandes (2).
12. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche 8 bis 11, **gekennzeichnet durch** die Tatsache, dass die Differentialrotation der Antriebsvorrichtung (14) des gelenkigen Parallelogrammes, das jedes der Aufnahme- und Transfermodule (6) bildet, relativ zur Bewegung der Module (6) ihrerseits auf der Kreisführungsbahn derart abläuft, dass eine Beschleunigung auf den Zuschnitt (F), der sich auf dem Aufnahme- und Trans-

ferkopf (5) befindet, im Bezug auf die horizontale Standardkomponente der zirkulären Förderbewegung der Aufnahme- und Transfermodule (6), zusätzlich zur vertikalen Bewegung, die den Zuschnitt (F) näher an das Förderband (2) heranbringt, einwirkt, sodass letztere eine identische Geschwindigkeit wie die des Förderbandes (2), zumindest zu dem Zeitpunkt der Abgabe des Zuschnittes (F) auf das Förderband (2), aufweist.

13. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche, **gekennzeichnet durch** die Tatsache, dass die, in Form eines gelenkigen Parallelogrammes ausgebildeten Aufnahme- und Transfermodule (6) derart auf Antriebsvorrichtungen (12, 15) entlang der Kreisführungsbahn getragen werden, dass die Stützmodule (106) entlang der Kreisführungsbahn immer eine einzige Ausrichtung beibehalten, insbesondere eine horizontale Ausrichtung oder aber auf jeden Fall eine im wesentlichen parallel zum Zuschnitt an der Ausgaböffnung des Zufuhrmagazines (1) und diesbezüglich zu der Ebene, die die Achsen der beiden Wellen (7, 8) einschließt, verlaufende Ausrichtung.

14. Vorrichtung gemäß Anspruch 13, **gekennzeichnet durch** die Tatsache, dass auch die Aufnahme- und Transferköpfe (5), im Bezug auf die Achsen von der Gelenkverbindung (105, 805) der Aufnahme- und Transferköpfe (5) zu den entsprechenden Enden der zwei Gelenkarme (9, 10). immer die gleiche Ausrichtung aufweisen, insbesondere eine Ausrichtung, die parallel zu der der Trägermodule (106) verläuft.

15. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche 8 bis 14, **gekennzeichnet durch** die Tatsache, dass die Antriebsvorrichtungen der Aufnahme- und Transfermodule (6) **durch** zwei Scheiben (12, 15) gebildet werden, die Achsen aufweisen, die parallel zu den Wellen des Gelenkes und Antriebes (7, 8), die mit dem Trägermodul (106) verbunden sind, verlaufen, wobei eine dieser beiden Wellen (7), sich frei drehend, nur in der einen Scheibe (12) gehalten wird, während die andere Welle (8), sich frei drehend, nur in der anderen Scheibe (15) gehalten wird, wobei die Scheiben (12, 15) zwar zueinander parallel verlaufen, aber Achsen aufweisen, die in dem Maße zueinander versetzt sind, das dem Abstand zwischen den mit dem Trägermodul (106) der Aufnahme- und Transfermodule (6) verbundenen Wellen (7, 8) entspricht, wobei zumindest eine dieser Scheiben rotierend angetrieben wird, während die andere im Leerlauf rotiert.

16. Vorrichtung gemäß Anspruch 15, **gekennzeichnet durch** die Tatsache, dass die Ebene, die die zwei

Wellen (7, 8) des Gelenkes des Trägermodules (106) einschließt, horizontal verläuft und der Versatz der beiden Achsen der beiden Antriebsscheiben (12, 15) lediglich in horizontaler Ausrichtung erbracht ist.

17. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche 8 bis 16, **gekennzeichnet durch** die Tatsache, dass das Trägermodul (106) eine Länge in axialer Richtung der Scheiben (12, 15) aufweist, die im wesentlichen den Abmessungen des Zuschnittes (F) in der genannten Richtung entspricht, während jedes Trägermodul (106) zwei, drei oder mehr zueinander identische Aufnahme- und Transferköpfe (5) ausweist, wobei die genannten Aufnahme- und Transferköpfe (5), jeder mit seinen eigenen Gelenkhebeln (9, 10), beweglich mit den selben Gelenk- und Antriebswellen (7, 8), die an dem Trägermodul (106) angebracht sind und eine entsprechende Achsausdehnung aufweisen, verbunden sind,

18. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche, **gekennzeichnet durch** die Tatsache, dass das Förderband (2) zumindest ein Paar von Bändern (102) aufweist, wodurch die Aufnahme der Endabschnitte der Zuschnitte (F) und die Bildung eines freien Raumes oder Durchganges für die Aufnahme- und Transferköpfe (5) zwischen den Bändern beabsichtigt ist, wobei die beiden Bänder (102) Zähne oder Rippen (202) aufweisen, die einen Vorder- und Rückseitenhaltepunkte für die entsprechenden Schnittseiten des Zuschnittes (F) darstellen, und zwischen denen der jeweilige Zuschnitt (F) plaziert wird.

19. Vorrichtung gemäß Anspruch 18, **gekennzeichnet durch** die Tatsache, dass in Kombination mit den beiden gezahnten Förderbändern (102, 202) das Förderband (2), in einer nicht störenden Position zu den freien Durchgängen der sich unter Sog befindlichen Aufnahme- und Transferköpfe (5), eines oder ein Paar zusätzlicher zueinander und zu den gezahnten Förderbändern (102, 202) parallele Haltebänder (302) aufweist.

20. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche 8 bis 19, **gekennzeichnet durch** die Tatsache, dass sich jeder Aufnahme- und Transferkopf (5) unter Vakuum befindet, wobei die Kanäle, die diesen mit der Vakuumquelle verbinden, derart geformt sind, dass sie **durch** den Endabschnitt der leerlaufenden Welle (8) des Trägermodules hindurch verlaufen und in sich in einen Verteiler in Form zirkulärer Abschnitte (16, 116) erstrecken, wobei das Vakuum nacheinander folgend **durch** das Trägermodul (106) und den Antriebshebel (9), der rotierend im letzteren integriert ist, ge-

leitet wird, wobei sich die in den Antriebshebeln erstellten Kanäle **durch** die Bolzen des Gelenkes (105) in den Körper (205) der Aufnahme- und Transferköpfe (5) öffnen, der mit der Saugdüse, oder den Saugdüsen, oder der Saugkappe, oder den Saugkappen, verbunden ist.

21. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche 8 bis 20, **gekennzeichnet durch** die Tatsache, dass jeder Aufnahme- und Transferkopf (5) einen Körper (205) aufweist, an dem die Hebel gelenkig angebracht sind und der zumindest eine Saugkappe oder -Düse (17) trägt, wobei jede dieser Düsen oder Saugkappen mit Vorrichtungen verbunden ist, die die Bewegung in Richtung der Einzelentnahme des Zuschnittes aus dem Zufuhrmagazin (1) auslösen.

22. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche 20 und 21, **gekennzeichnet durch** die Tatsache, dass der abschließende mit der Vakuumpumpe verbundene Kanal im Körper des Aufnahme- und Transferkopfes (5) in Form eines Zylinders (605) erstellt ist, und in dessen Innerem, auf eine abgeschlossene und gleitende Weise, und gegen die Kraft einer Feder (19), die gegen die Außenseite drückt, die ebenfalls zylindrische und hohle Trägerstange (117) einer Saugkappe (17) untergebracht ist.

23. Vorrichtung gemäß einem oder mehrerer der voranstehenden Ansprüche, **gekennzeichnet durch** die Tatsache, dass für das Zufuhrmagazin (1), mit dem Ziel die Einzelentnahme des letzten Zuschnittes (F) aus dem Stapel im Zufuhrmagazin (1), der sich an der Entnahmeöffnung desselben befindet, zu unterstützen, eine Verengung (101, 201) vorgesehen ist, derart, dass der letzte Zuschnitt eine gewölbte Position einnimmt und sich so in der Mitte selbstständig von den darüberliegenden Zuschnitten löst.

## Revendications

1. Dispositif d'acheminement/singularisation d'ébauches, d'étiquettes ou similaires, en particulier dans une machine de conditionnement de cigarettes, comportant :

- un dispositif d'acheminement (1) d'ébauches (F) ayant une extrémité d'évacuation :
- un convoyeur (2) des ébauches ayant une extrémité d'entrée connectée à l'extrémité d'évacuation du dispositif d'acheminement (1),
- des moyens de saisie/transfert (5, 6, 17) d'une ébauche (F), qui saisissent une première ébauche au moment où elle sort de l'extrémité d'éva-

uation du dispositif d'acheminement (1), et la transportent en la déposant sur l'extrémité d'entrée du convoyeur (2), ayant un axe transversal à la direction d'avancée (A) du convoyeur (2), les moyens de saisie/transfert (5, 6, 17) ayant au moins un module de saisie/transfert (6) qui est guidé sur une piste circulaire ayant un axe transversal à la direction d'avancée (A) du convoyeur (2), entre la position de saisie de l'ébauche (F) au niveau de l'extrémité d'évacuation du dispositif d'acheminement (1) des ébauches (F) et la position où l'on dépose l'ébauche sur le convoyeur (2), le module de saisie/transfert (6) ayant des têtes de saisie/transfert (5),

- des moyens d'entraînement (14) destinés à déplacer les têtes de saisie/transfert (5) entre l'extrémité d'évacuation du dispositif d'acheminement (1) et le convoyeur (2),

### caractérisé en ce que

les moyens de saisie/transfert (5, 6, 17) sont agencés sous le convoyeur (2) sur le côté opposé au dispositif d'acheminement (1),

- le convoyeur (2) a des passages longitudinaux destinés aux têtes de saisie/transfert (5) coopérant avec l'ébauche.

2. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens d'entraînement comportent des moyens (7, 8, 9, 10, 12, 13, 14, 24) qui font varier au moins la composante de mouvement des têtes de saisie/transfert (5) dans la direction d'avancée (A) du convoyeur (2), d'une manière telle qu'au moment de déposer l'ébauche (F) sur ledit convoyeur (2), les têtes de saisie/transfert (5) et l'ébauche (F) portées par celles-ci, ont la même vitesse dans la direction d'avancée que le convoyeur (2) lui-même.

3. Dispositif selon la revendication 2, **caractérisé en ce que** lesdits moyens de variation (7, 8, 9, 10, 12, 13, 14, 24) de la vitesse selon au moins une composante de mouvement sont fabriqués de manière à pouvoir faire varier éventuellement également la vitesse d'une ou des deux composantes de mouvement circulaire pour garantir un positionnement relatif constant des têtes de saisie/transfert (5) et du dispositif d'acheminement (1), au moins pendant le cycle de saisie de l'ébauche (F) à partir dudit dispositif d'acheminement (1).

4. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le module de saisie/transfert (6) est formé par un module de support (106) qui est guidé le long de la piste circulaire (P) par des moyens formant convoyeur

- (12, 15) ayant éventuellement une vitesse de rotation constante, tandis qu'une tête de saisie/transfert (5) est fournie, qui est agencée de manière mobile au moins selon l'une des deux composantes de mouvement circulaire, de préférence selon les deux composantes du mouvement circulaire par rapport au module de support (106), par l'intermédiaire des moyens de variation (7, 8, 9, 12, 13, 14, 24) de la vitesse d'avancée de ladite tête par rapport au module de support associé (106).
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5. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la direction de saisie des ébauches (F) à partir du dispositif d'acheminement (1) est perpendiculaire, ou dans un cas quelconque transversale à la direction d'avancée (A) du convoyeur (2).
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6. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les moyens de saisie/transfert ont une pluralité de modules de saisie/transfert (6) qui sont répartis de manière angulaire et équidistants le long de la piste circulaire (P).
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7. Dispositif selon l'une quelconque des revendications 2 à 6, **caractérisé en ce que** les moyens (7, 8, 9, 10, 13) qui font varier (7, 8, 9, 10, 13) les composantes de mouvement de la tête ou des têtes de saisie/transfert (5) des modules de saisie individuels (6) sont connectés au module (6) eux-mêmes, et se déplacent ensemble avec ceux-ci sur la piste circulaire (P).
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8. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** chacun des modules de saisie/transfert (6) est constitué d'un module de support (106) et d'au moins une tête de saisie/transfert (5), de préférence plusieurs têtes de saisie côte à côte les unes par rapport aux autres, et ladite tête ou lesdites têtes (5) sont articulées sur le module de support (106) par l'intermédiaire d'une paire de leviers (9, 10), pour former un quadrilatère articulé, et lesdits bras ont un point d'appui sur des arbres (7, 8) à distance les uns des autres, et qui sont supportés en tournant librement dans le module de support (106), et qui sont agencés le long des côtés dudit module de support (106) transversalement par rapport à la direction d'avancée (A), respectivement sur l'avant et sur l'arrière en se reportant à la direction d'avancée (A) elle-même, au moins un de ces leviers (7) constituant le levier d'entraînement du quadrilatère articulé, et est agencé tournant avec son propre arbre (7) qui coopère également en rotation de manière dynamique (13) avec les moyens d'entraînement rotatifs (14) de celui-ci qui tournent coaxialement par rapport à la piste circulaire (P) des modules de saisie/transfert (6), et qui sont entraînés de manière rotative en ayant une vitesse et/ou direction de rotation différentes de celles des modules de saisie/transfert (6) le long de la piste circulaire (P).
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9. Dispositif selon la revendication 8, **caractérisé en ce que** la rotation différentielle des moyens d'entraînement rotatifs des arbres (7) connectés aux leviers d'entraînement (9) des quadrilatères articulés est telle que les têtes de saisie/transfert (5) se déplacent selon des composantes différentielles de mouvement à la fois radialement de même que transversalement par rapport à la piste circulaire d'avancée (P) des modules de support, pour annuler sensiblement les composantes de mouvement rotatif dans la position de saisie de l'ébauche à partir du fond du magasin.
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10. Dispositif selon la revendication 9, **caractérisé en ce que** les composantes tangentielles sensiblement horizontales et dans la direction d'avancée (A) du convoyeur à bande (1) sont annulées par le déplacement vers l'arrière de la tête de saisie/transfert (5) due à l'actionnement du parallélogramme articulé, tandis qu'un mouvement résultant de ladite tête (5) exécute un mouvement sensiblement parallèle à l'axe du magasin ou à la direction de déchargement de l'ébauche à partir de celui-ci.
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11. Dispositif selon l'une quelconque des revendications 2 à 10, **caractérisé en ce que** les moyens de variation du mouvement sont inactifs ou sensiblement inactifs dans la position dans laquelle l'ébauche (F) est déposée sur le convoyeur à bande (2), lorsque le mouvement des modules de saisie/transfert (6) situés sur la piste circulaire est exécuté à une vitesse telle que les têtes de saisie/transfert (5) ont une composante de vitesse de mouvement dans la direction d'avancée (A) du convoyeur à bande (2) qui est égale à la vitesse d'avancée dudit convoyeur à bande (2).
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12. Dispositif selon l'une quelconque des revendications 8 à 11, **caractérisé en ce que** la rotation différentielle des moyens d'entraînement (14) du parallélogramme articulé qui forme chaque module de saisie/transfert (6) par rapport au mouvement des modules (6) eux-mêmes sur la piste circulaire, est telle qu'en plus du déplacement vertical amenant l'ébauche (F) plus proche du convoyeur à bande (2), une accélération est imprimée à l'ébauche (F) située sur la tête de saisie/transfert (5) par rapport à la composante horizontale normale du mouvement circulaire d'avancée des modules de saisie/transfert (6), qui s'ajoute à cette dernière en devenant la vitesse de la tête de saisie/transfert identique à celle du convoyeur à bande (2), au moins au moment où l'ébauche (F) est déposée sur le con-
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voyeur à bande (2).

13. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les modules de saisie/transfert (6) ayant la forme d'un parallélogramme articulé sont transportés sur des moyens d'entraînement (12, 15) le long de la piste circulaire, de telle sorte que le module de support (106) se déplace le long de la piste circulaire en gardant toujours une orientation unique, en particulier une orientation horizontale ou dans un cas quelconque sensiblement parallèle à l'ébauche sur l'ouverture d'évacuation du magasin (1), et en se reportant au plan contenant l'axe des deux arbres (7, 8).
14. Dispositif selon la revendication 13, **caractérisé en ce que** les têtes de saisie/transfert (5) ont toujours la même orientation, en particulier une orientation parallèle à une orientation du module de support (106) en ce qui concerne les axes d'articulation (105, 805) des têtes de saisie/transfert (5) par rapport aux extrémités correspondantes des deux bras d'articulation (9, 10).
15. Dispositif selon l'une quelconque des revendications 8 à 14, **caractérisé en ce que** les moyens d'entraînement des modules de saisie/transfert (6) sont formés par deux disques (12, 15) ayant des axes parallèles aux arbres d'articulation, et par un entraînement (7, 8) connecté aux modules de support (106), un premier des deux arbres (7) étant supporté tournant librement seulement dans un premier disque (12), tandis que l'autre arbre (8) est supporté tournant librement seulement dans l'autre disque (1), et les disques (12, 15) étant parallèles l'un à l'autre, mais ayant des axes étagés l'un par rapport à l'autre dans une dimension qui correspond à la distance entre les arbres (7, 8) connectés aux modules de support (106) des modules de saisie/transfert (6), au moins un de ces disques étant entraîné en rotation tandis que l'autre tourne à vide.
16. Dispositif selon la revendication 15, **caractérisé en ce que** le plan contenant les deux arbres d'articulation (7, 8) du module de support (106) est horizontal, et l'étagement des axes des deux disques d'entraînement (12, 15) est fourni seulement dans la direction horizontale.
17. Dispositif selon l'une quelconque des revendications 8 à 16, **caractérisé en ce que** le module de support (106) a une longueur, dans la direction axiale des disques (12, 15), qui correspond sensiblement à la dimension de l'ébauche (F) dans ladite direction, tandis que chaque module de support (106) a deux, trois têtes de saisie/transfert (5) ou plus, identiques les unes aux autres, lesdites têtes de saisie/transfert (5) sont articulées avec leurs propres leviers d'articulation (9, 10) sur le même arbre d'articulation, et un entraînement (7, 8) connecté au module de support (106), et qui a un prolongement axial correspondant.
18. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le convoyeur à bande (2) a au moins une paire de bandes (102) prévues pour venir coopérer avec les zones d'extrémité des ébauches (F), et qui forment entre elles une zone libre ou un passage destiné au passage des têtes de saisie/transfert (5), tandis que les deux bandes (102) ont des dents ou nervures (202) qui forment des butées avant et arrière avec les bords qui correspondent de l'ébauche (F), et entre lesquelles chaque ébauche (F) est positionnée.
19. Dispositif selon la revendication 18, **caractérisé en ce que**, en combinaison avec les deux convoyeurs à bandes à dents (102, 202), le convoyeur à bande (2) a, dans une position où il ne gêne par le passage libre des têtes de saisie/transfert (5), une bande de maintien supplémentaire (302), ou une paire de celles-ci, ou plusieurs de celles-ci, parallèles les unes aux autres, et aux convoyeurs à bandes à dents (102, 202), et qui sont sous aspiration.
20. Dispositif selon l'une quelconque des revendications 8 à 19, **caractérisé en ce que** chaque tête de saisie/transfert (5) est sous vide, comme les conduits se connectant à la source de vide sont fabriqués pour passer à travers le tronçon d'extrémité de l'arbre fou (8) du module de support, et qui s'étendent de même dans un distributeur sous la forme de tronçons circulaires (16, 116), tandis qu'ensuite ils sont amenés à travers le module de support (106) par l'intermédiaire des leviers d'entraînement (9) rotatifs en un seul bloc avec ces derniers, tandis que les conduits correspondants fabriqués dans les leviers d'entraînement s'ouvrent à travers les broches d'articulation (105) dans le corps (205) des têtes de saisie/transfert (5) qui se connectent à la buse ou aux buses ou au(x) gobelet (s) d'aspiration (17).
21. Dispositif selon l'une quelconque des revendications 8 à 20, **caractérisé en ce que** chaque tête de saisie/transfert (5) a un corps (205) sur lequel les leviers sont articulés, et qui porte au moins un gobelet ou une buse d'aspiration (17), ou plusieurs de ceux-ci, chacune de ces buses ou chacun de ces gobelets d'aspiration étant connectés à des moyens destinés à libérer le mouvement dans la direction de séparation de l'ébauche (F) à partir du dispositif d'acheminement (1).
22. Dispositif selon l'une quelconque des revendications 20 et 21, **caractérisé en ce que** le conduit

d'extrémité de connexion à la source de vide situé dans le corps des têtes de saisie/transfert (5) est fabriqué sous la forme d'un cylindre (605), et est positionné à l'intérieur d'une manière coulissante hermétique à l'encontre de l'action d'un ressort (18) poussant vers l'extérieur la tige de support (17) d'un gobelet d'aspiration (17) qui est lui-même également cylindrique et creux.

23. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** pour aider à séparer la dernière ébauche (F) de la pile présente dans le dispositif d'acheminement (1), et qui est située au niveau de l'évacuation de celui-ci, on prévoit que le dispositif d'acheminement (1) ait un rétrécissement (102, 201), de telle sorte que la dernière ébauche prend une position arquée, en se séparant elle-même au niveau du centre de celles du dessus.

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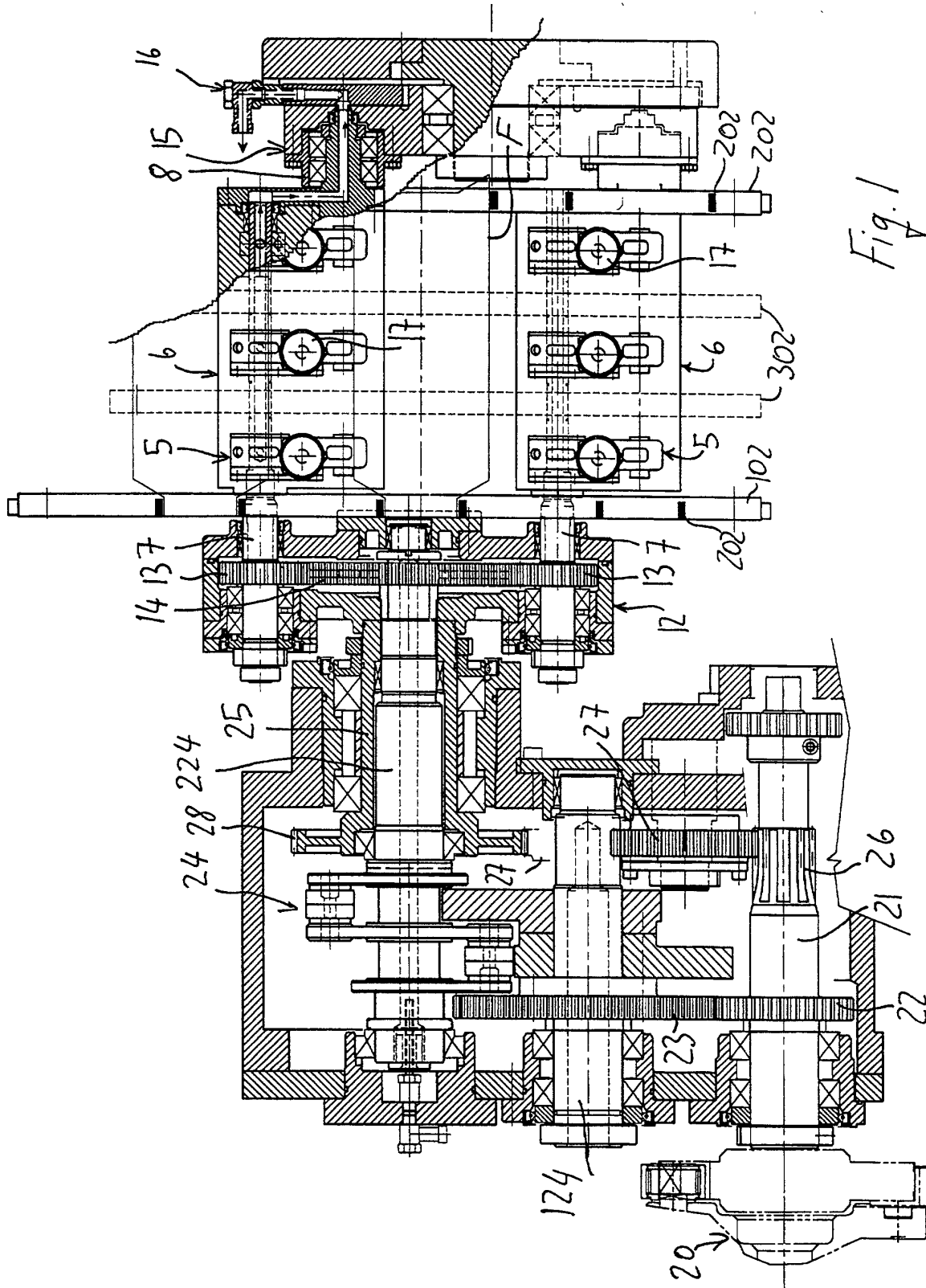


Fig. 1

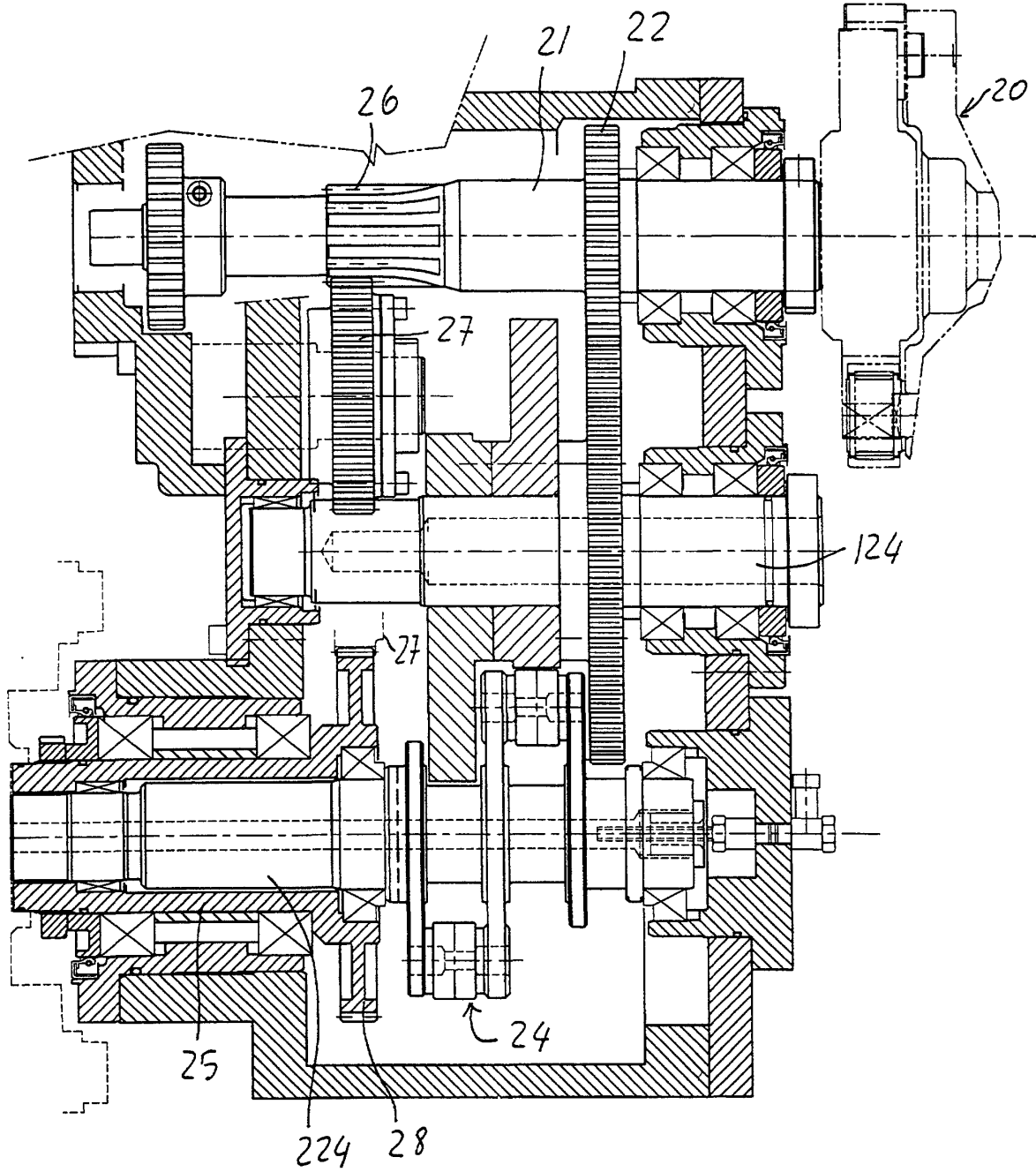


Fig. 2

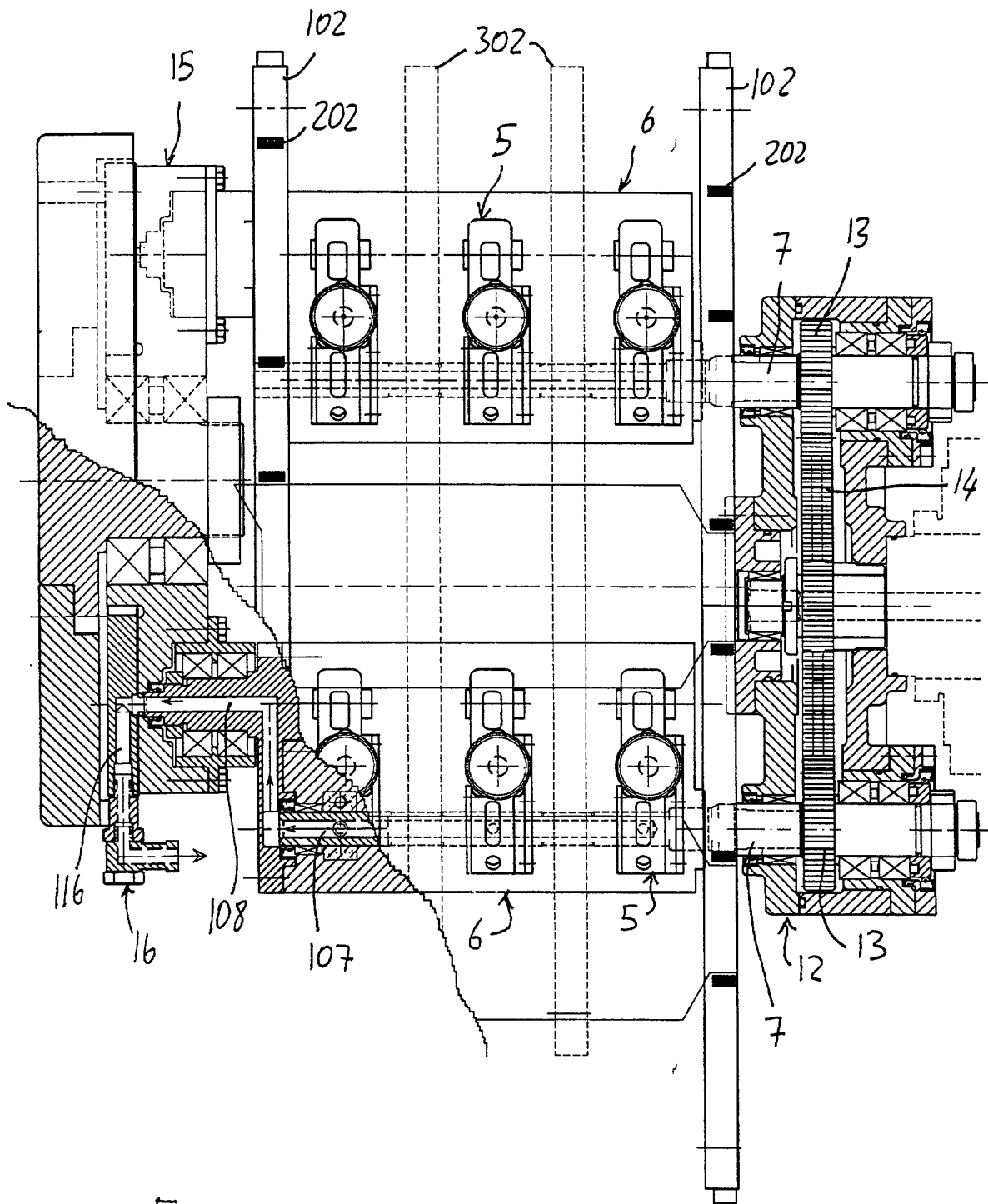


Fig. 3

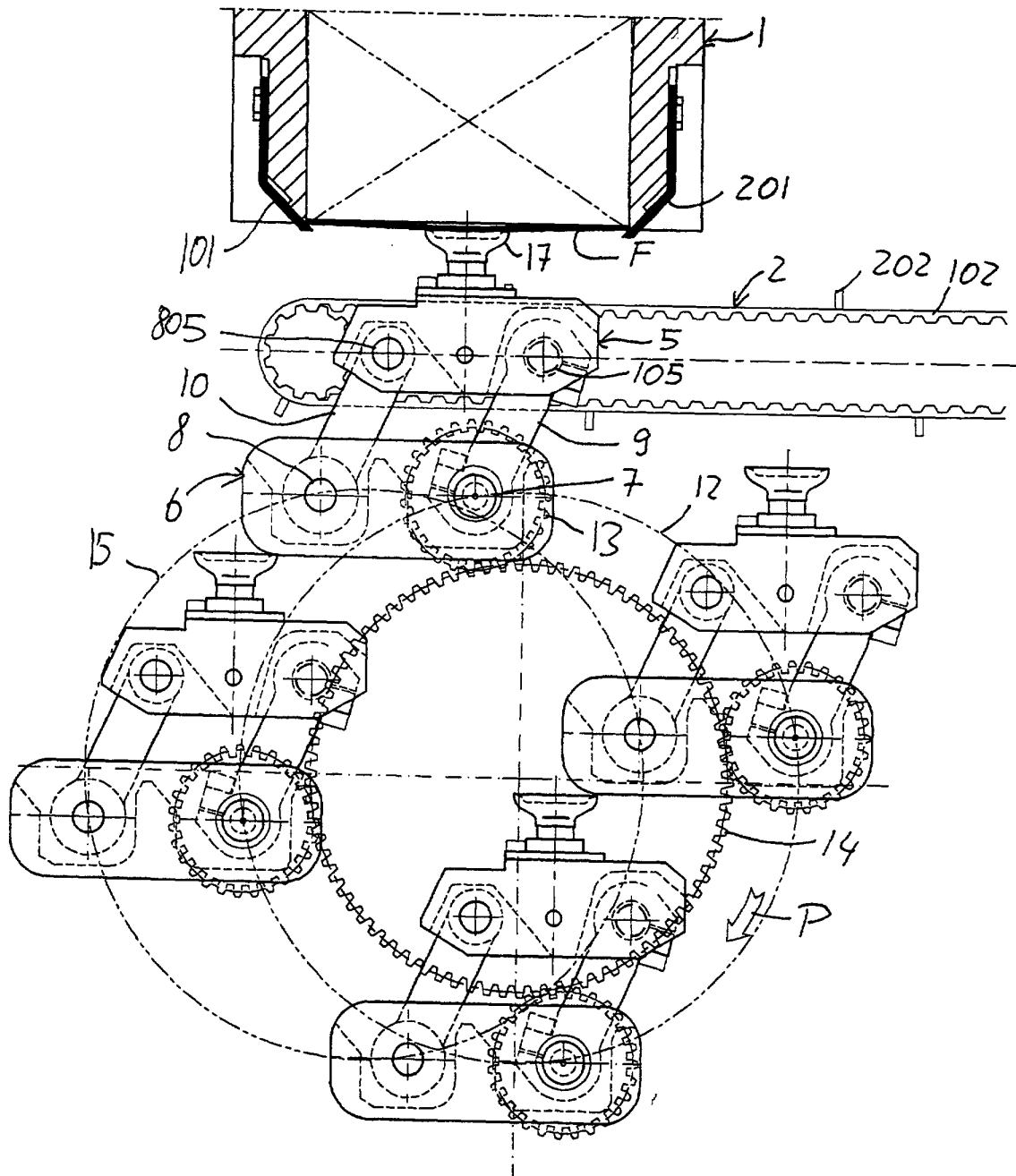


Fig. 4



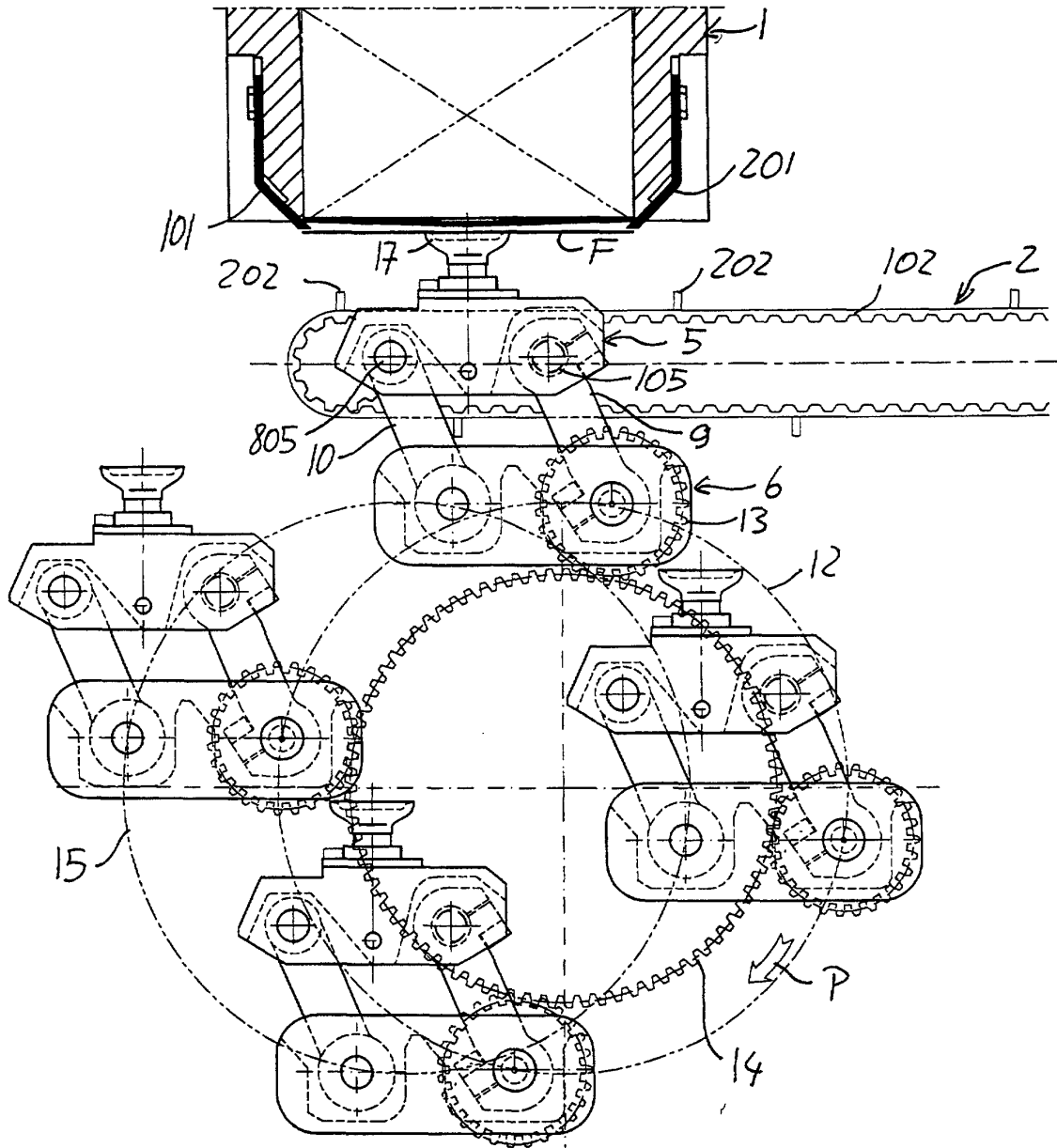


Fig. 6

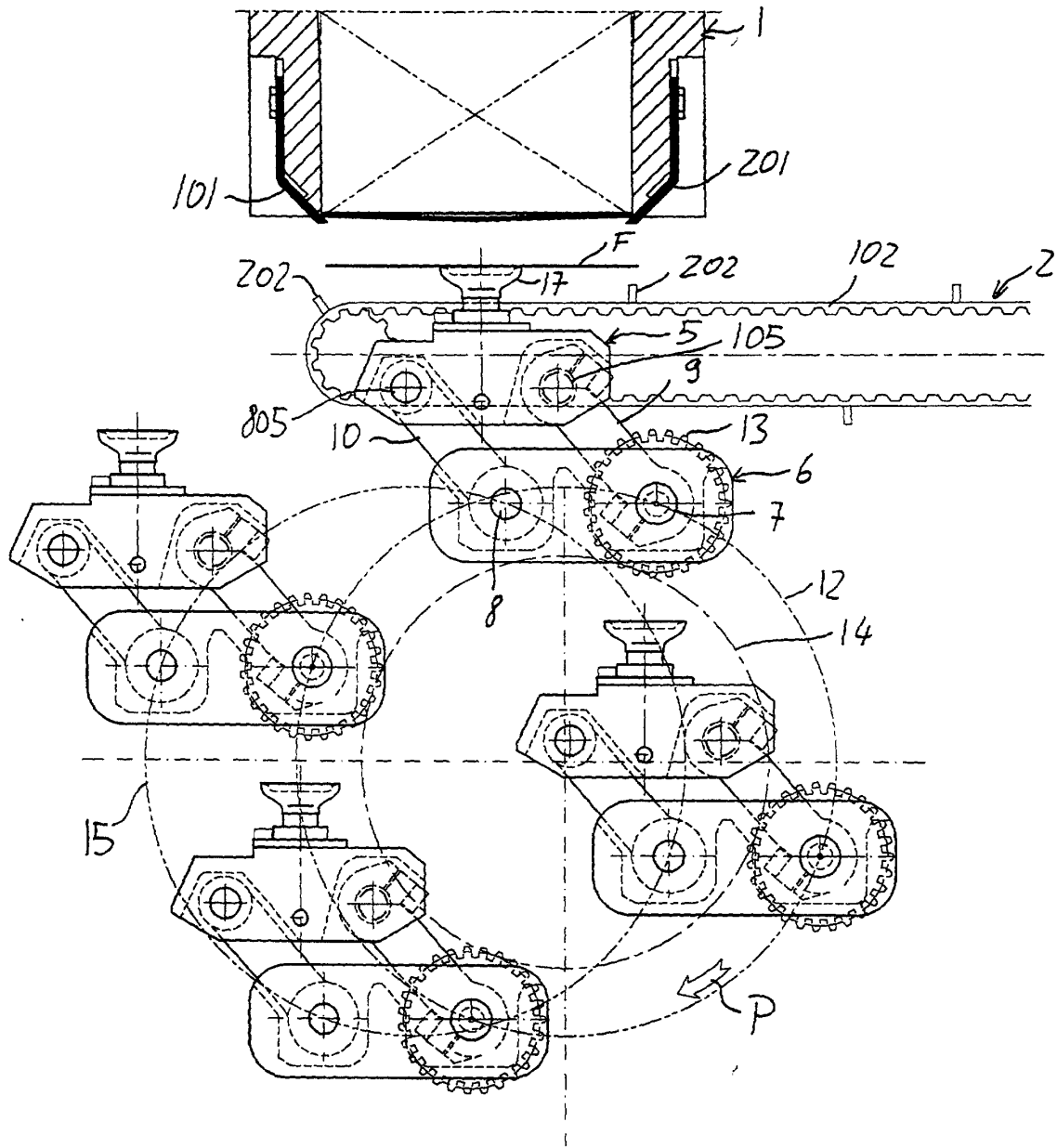


Fig. 7

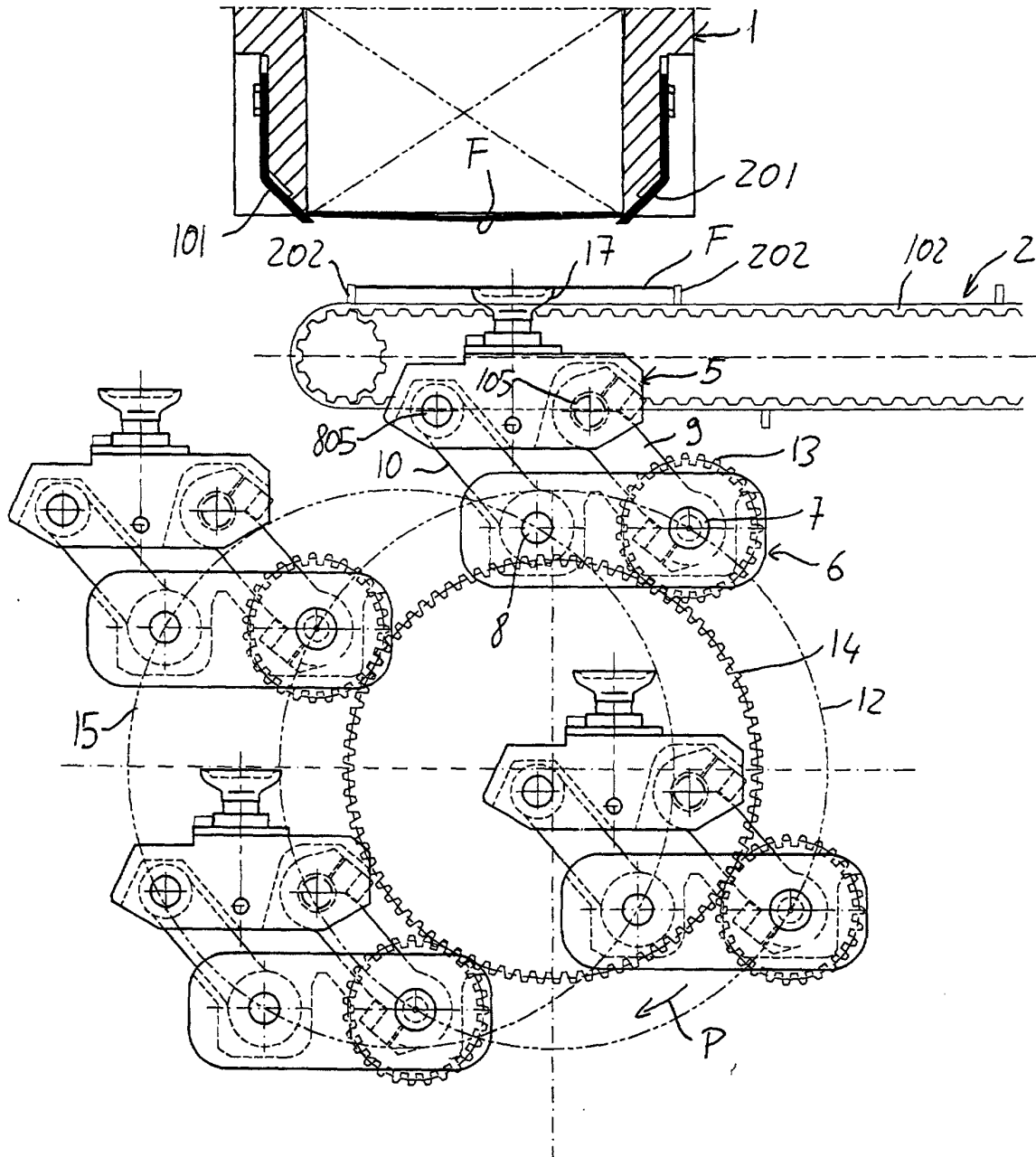


Fig. 8

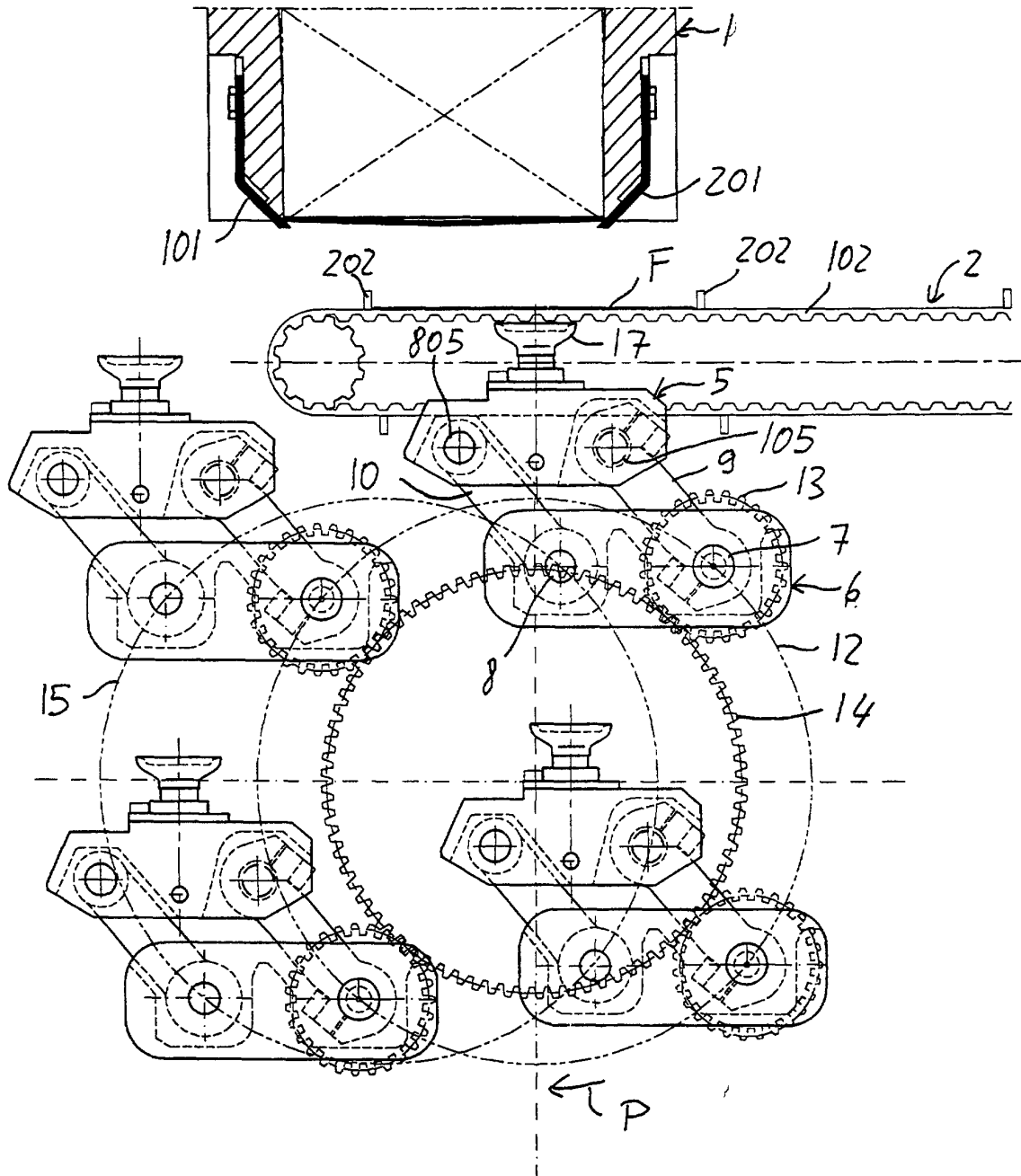


Fig. 9

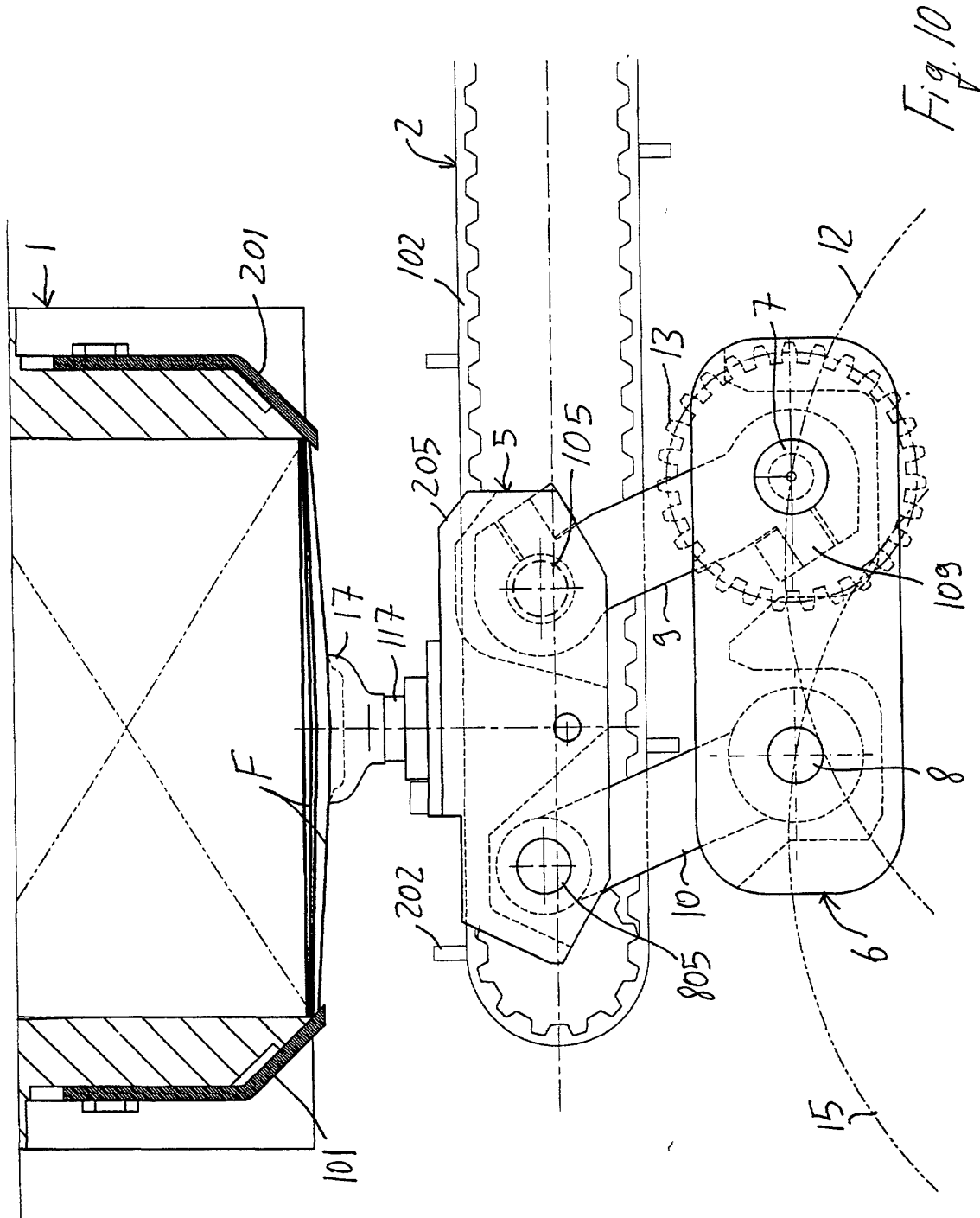


Fig. 10

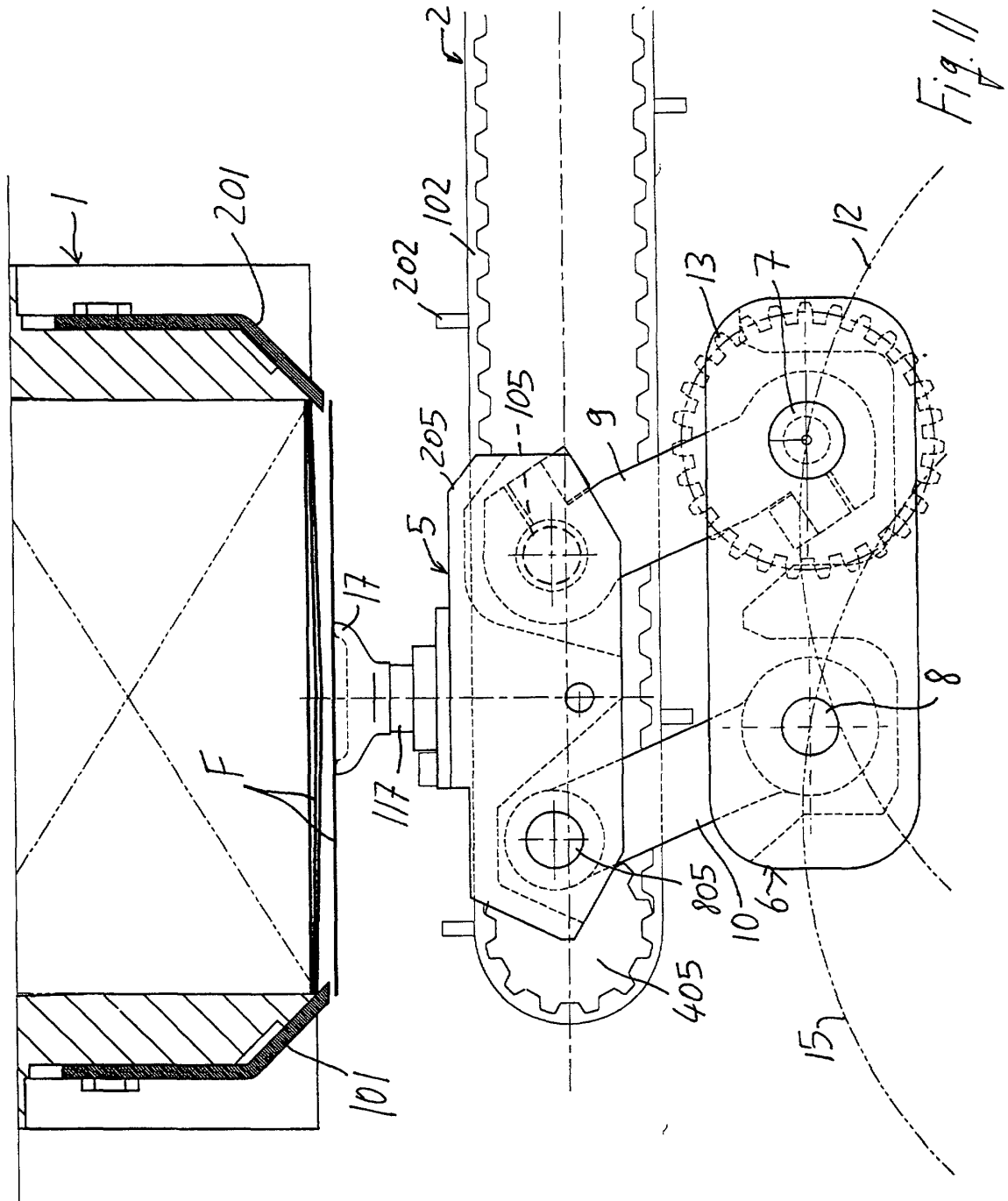


Fig. 11

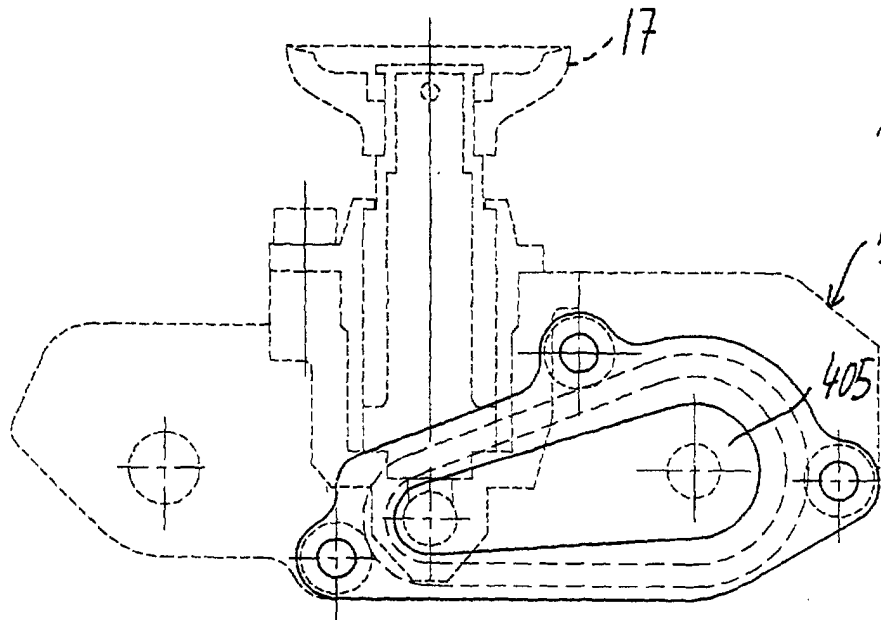


Fig. 12

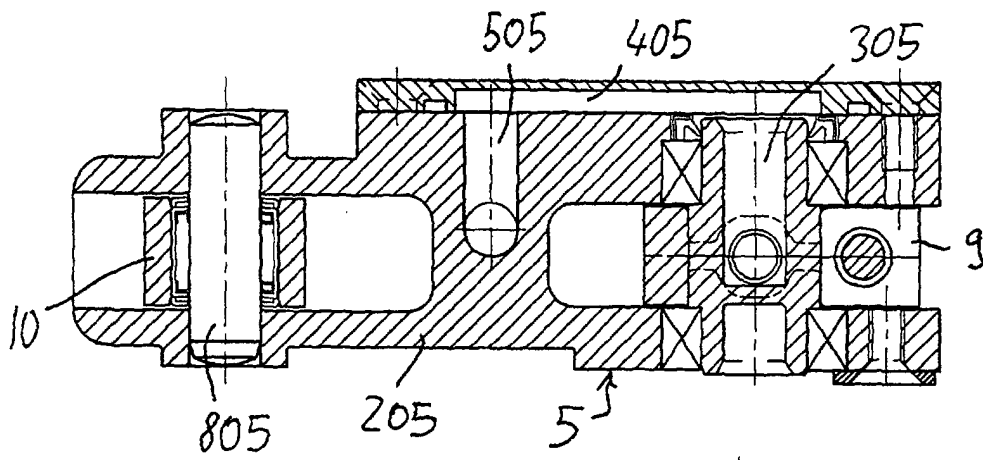
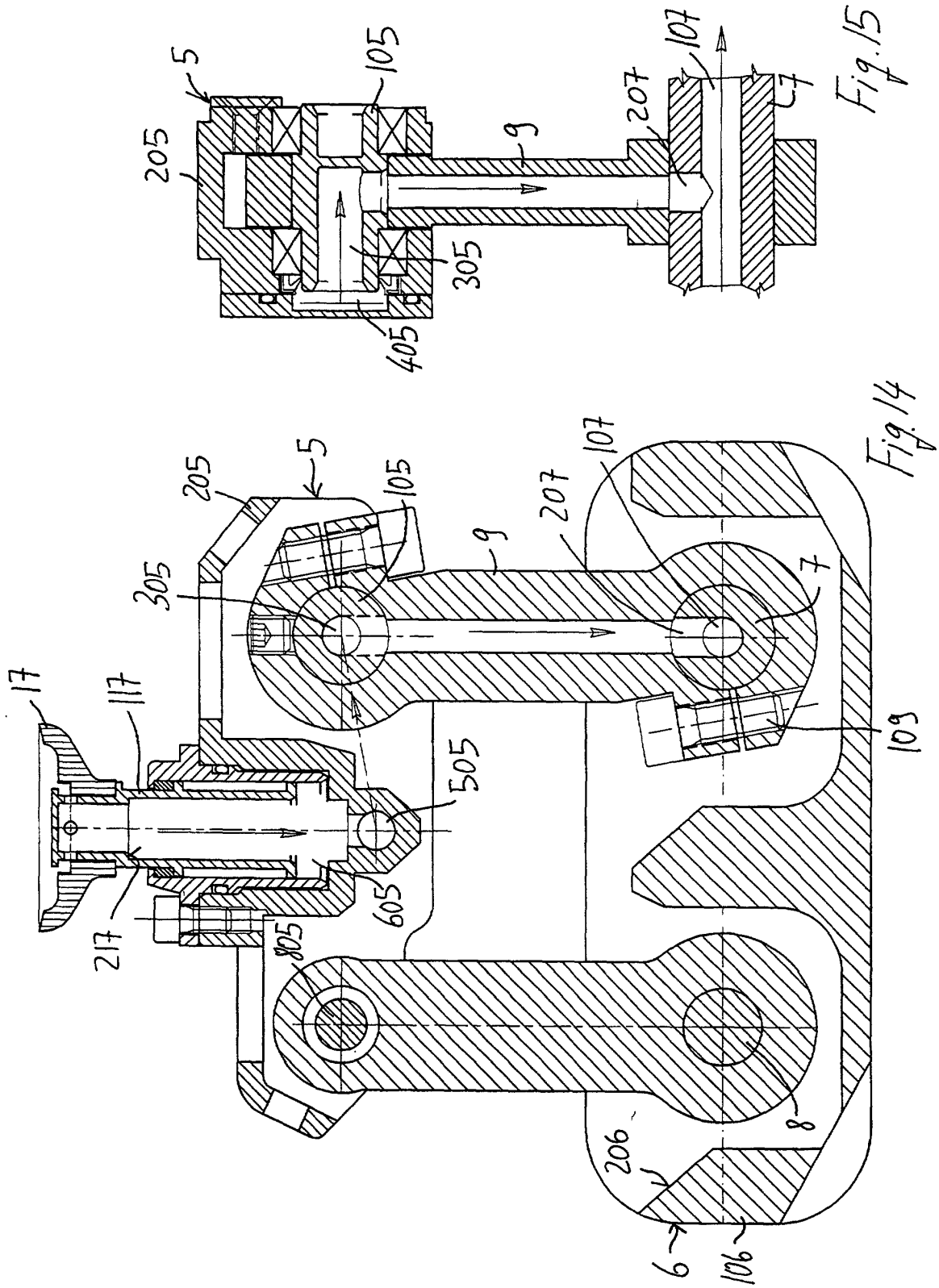


Fig. 13



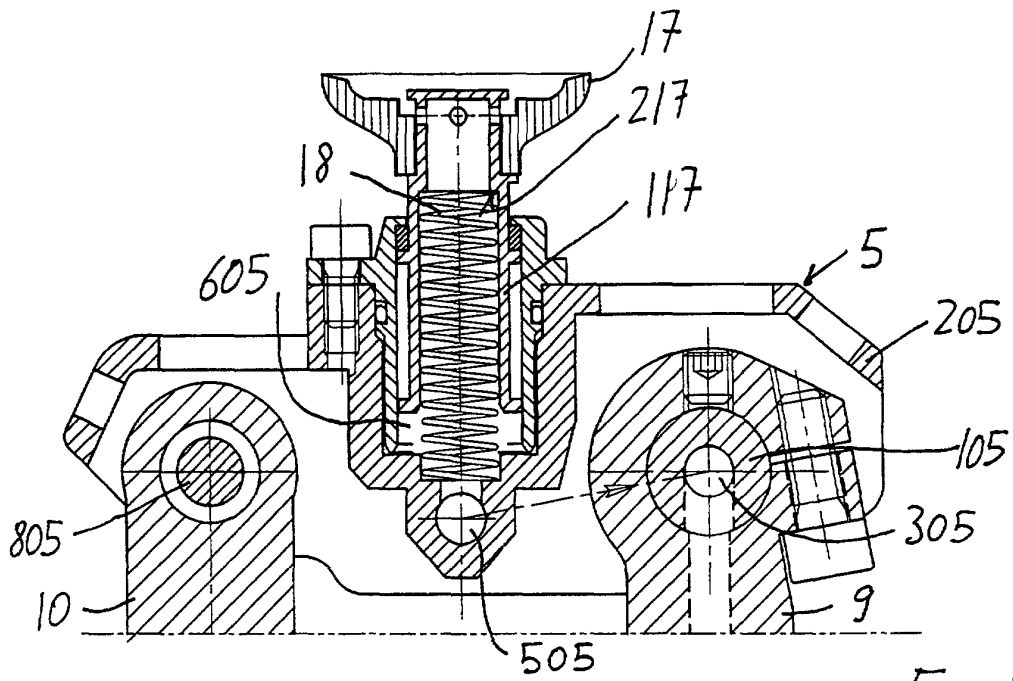


Fig. 16

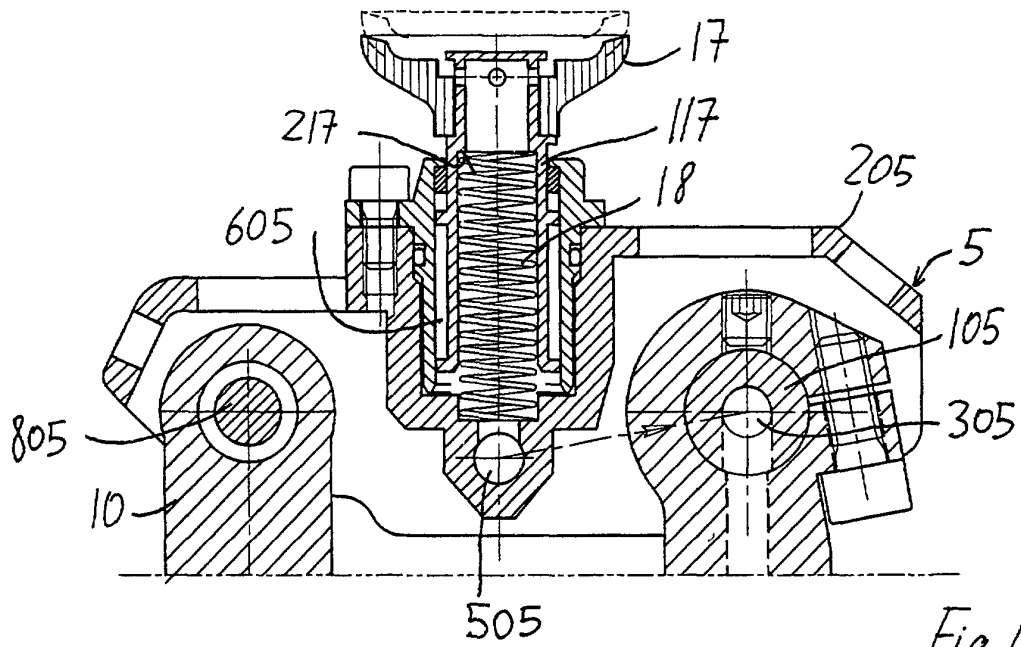


Fig. 17

Fig. 18

